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Tarvia
Preserves Roads
Prevents Dust

Tarvia-Slag on Lincoln Highway—

IN 1914 the Borough of Ben Avon, Pa., a suburb of Pittsburgh, found it necessary to pave an unimproved section of one of the main roads passing through that Borough (now a part of the Lincoln Highway). Their problems were steep grades, heavy traffic and limited funds.

Guided by their past successes, they turned to Tarvia for a solution. They used crushed blast-furnace slag, bonding and sealing with "Tarvia-X" by the Penetration Method. The result has been a most economical and satisfactory road.

After two and a half years of continuous traffic up and down hills, dipping into a cañon-like ravine, this Tarvia-Slag road is in excellent condition.

It has a tough, plastic, cementitious surface, good alike for horses and automobiles. Such a surface can be maintained indefinitely at low cost.

Of all bitumens Tarvia, by its superior adhesive and cementing properties, is the one best adapted for use with slag. Tarvia and slag, when combined, furnish a road-surface remarkable for its durability and economy.

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TRADE B MARK

Brighton Road (Section of Lincoln Highway showing a 10 per cent. grade), Ben Avon. Pa. Constructed with "Tarvia-X" in 1914

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MACK Reliability Comes Into Play

A dead trolley in a big city means ruined schedules, limping service for hours after --financial loss and loss of good will.

As the most effective means of overcoming this trouble, the United Railway and Electric Company of Baltimore purchased a MACK emergency outfit.

The MACK has speed. And the MACK reputation for reliability over a period of twenty years convinced the managers of the United Railway and Electric Company that the emergency truck would always appear promptly at the seat of trouble. Now day or night, winter and summer the MACK speeds first aid to Baltimore's traction troubles.

MACK trucks are made in sizes from 1 to 7½ tons capacity. Body types can be designed to meet your special needs. Write for catalogues and records of MACK performances.

INTERNATIONAL MOTOR COMPANY
NEW YORK

Municipal Journal

Volume XLIII NEW YORK, AUGUST 9, 1917 No. 6

SEWER WORK IN ROCK AND QUICKSAND

Comparative Bids on Brick and Segment Block Sewer—Excavating by Clam-Shell and Trench Machine—Horizontal and Vertical Sheathing—Handling Trench in Quicksand.

BY W. E. HARDENBURG.

Following the introduction of the tile sewer in St. Louis something more than a year ago, the use of this type of conduit is increasing rapidly in the Missouri metropolis. In some work recently completed in Baden, a section in the northern extremity of St. Louis, several interesting processes were evolved in coping with the conditions encountered during the construction.

In the first job, in Baden Sewer District No. 2, bids were asked for 9,500 feet of vitrified clay pipe sewers, 12 to 33 inches in diameter, and for 2,800 feet of sewer from 39 to 57 inches in diameter. The advertisement for tenders provided that the bids might be made for sewers to be constructed either of brick laid in Portland cement or of two-ring segment block made of vitrified tile.

The 357 feet of 57-inch sewer was to be 13 inches thick, if of brick, while the other sizes—39 to 54 inches—were to be 9 inches thick. In case the bid was to be for tile sewers, it was specified that the thickness of the sewer was to vary from 7¼ inches for the 57-inch pipe to 5½ inches for the 39-inch.

Bids on the tile sewer were to be per lineal foot, but the bids based on the brick type were to be per cubic foot of brick masonry, the quantities being estimated. The cost of excavation was to be calculated distinct from the cost of the material itself, as, owing to the comparative thinness of the tile, less excavation would be required if tile were to be used.

Another clause provided that, if the tile were to be used, the sewer was to be supported by haunches of concrete of a mixture of 1:3:6, the contractor to figure costs for this on estimated quantities to be provided by city engineers.

The following shows the lowest bids per lineal foot for brick and tile, respectively:

Size	Brick	Tile
39-inch	$3.11	$2.31
45-inch	3.50	2.64
48-inch	3.69	2.97
54-inch	4.08	3.30
57-inch	6.56	4.27

The contract was awarded to the G. B. Prendergast Construction Co. for the construction.

PROGRESSIVE STEPS IN LAYING A 54-INCH SEWER.

On this job all the excavation work was done by a clam-shell bucket, hung from the end of a 45-foot boom, mounted on a bull-wheel derrick. The soils met with varied from slack clay to quicksand, and some difficulty was experienced at first in the latter.

In the clay sections of the line, the trench ordinarily was braced with 3-inch horizontal sheeting, inserted in 20-foot lengths, the cross-braces being 6 by 6, spaced 10 feet center to center.

In the quicksand section, the top clay was sustained as mentioned above and, in addition, 3-inch tongue and groove sheet-piling was driven to 3 feet below the flow line of the sewer. The piling, which consisted of 3 by 10-inch pine boards with ¾-inch tongue and groove, was driven down with a 33,000-pound Arnott steam hammer in double leads that moved on rollers on both sides of the ditch. As a rule, all this sheeting and piling was left in.

The bottom excavation was all done in 20-foot sections, bulkheads being erected at the end of each section. When the desired depth was reached, 1 by 12-inch transversals were nailed to 2 by 4-inch sills and a layer of concrete in burlap sacks placed on the flooring as the permanent foundation.

The invert also was laid in 20-foot sections as a rule, though in especially bad places the sections were only 10 feet long. In constructing the arch, an 8-foot wooden center with loose lagging for the middle 18 inches was employed, thus permitting the worker to stand in the center and lay the tile on both sides.

Throughout the work, gravel was used to provide a solid bearing for the outside blocks. In most cases the inner blocks were cut to fit around all junctions. Pipe-line connections were made by means of 45 degree slants, and the spaces between the pipes and blocks were filled with brickwork. The manholes were constructed of brick from the spring to the surface, while reducers, 10 feet in length, were constructed of rings of brick.

Curves in the invert were formed by means of a wooden templet, cut to the required radius. The arch was laid with a 5-foot center, built to the curve.

In some places on curves a certain amount of difficulty was experienced in connection with joining the inner and outer blocks in such a way as to prevent leakage. It was found that great care was necessary in making the joints.

In the second job, which was in Baden Sewer District No. 3, just north of the work described above, the principal sizes of tile sewers laid were 39-inch and 51-inch. Here a large stretch of the soil encountered was rock, and hence the prices, specifications and methods of procedure in general were somewhat different than in the work so far described.

The contract provided that in places where the excavation was solid rock, only the liner block of the invert need be laid, a bed of concrete on the rock bottom taking the place of the outer block.

On this basis, the prices per lineal foot were:

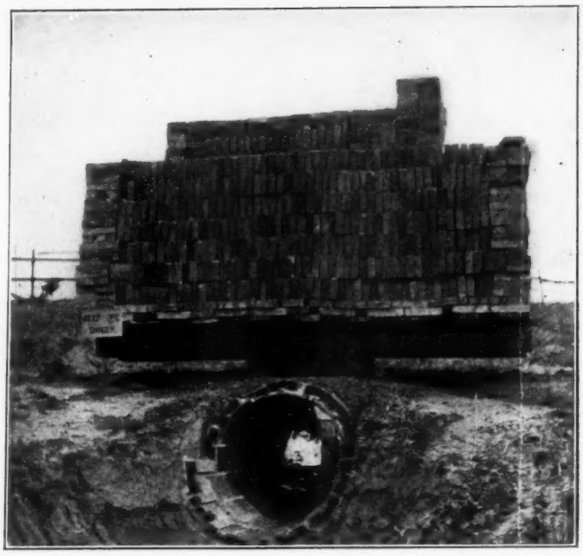
Size	Double Block	Inner Block Only
39-inch	$3.00	$2.50
51-inch	4.00	3.50

The saving in rock excavation effected by omitting the outer block was estimated, where the 51-inch sewer was laid, at approximately 2 cubic feet per lineal foot of trench. For the 39-inch sewer, the saving was somewhat less.

Where the liner block only was used, the rock was excavated to the required depth and a foundation of 1:3:6 concrete was laid on top of the rock. Generally, a somewhat dry mix was employed. The concrete filled the holes caused by the blasting and formed a bed upon which the liner blocks were laid. As soon as this was done, the concrete was left to set. The rest of the work was done as in ordinary cases.

Apart from the rock, sand constituted the principal soil met with in this job. No quicksand was encountered. In addition to the clamshell, a Potter sewer trench machine was employed.

FIFTY-ONE-INCH SEWER ON 25-FOOT RADIUS.



TESTING 48-INCH SEGMENT BLOCK SEWER.

The tile used in both of the jobs described was what is known as the Ferguson block. It is made in St. Louis by the Evens and Howard Fire Brick Company.

Some interesting tests were carried out with this block by the St. Louis engineering authorities. Two sections of 60-inch sewer, each 7½ feet long, one of tile, 7¼ inches thick, and one of two-ring brick, 9 inches thick, were buried, the haunches being thoroughly rammed to insure a firm bearing. Through sand cushions, a load was applied to an area of 4 feet along the axis of the sewer by 3½ feet wide. Both types of sewer showed a crack at a pressure of 57,000 pounds. At a pressure of 116,000 pounds, the tile collapsed and the brick also virtually succumbed. In another test the tile withstood a pressure

Both of these jobs, and the test as well, were carried on under the supervision of Benjamin Moreel, assistant engineer of the Board of Public Service of the City of St. Louis.

OILING ROADS IN IOWA.

A greater amount of earth road oiling was carried on in Iowa in 1916 than in any previous year. Very satisfactory results were obtained, a better quality of oil being used and more care taken in the preliminary preparation of the road for the treatment. Oils vary greatly and it is essential that a suitable one be used. The Iowa Highway Commission tests oils and advises road authorities as to the quality.

The following is the anlysis of an oil which has been used with success:

Specific viscosity, 100 c. c. 50° C. (Engler)	30.1
specific viscosity, 100 c. c. 50° C. (Engler)	30.1
Loss on heating 163° C.-5 hrs	2.14%
Character of residue	Sticky
Total bitumen	99.93
Bitumen insoluble in 86° Be. naphtha	8.46
Fixed carbon	7.13
Ash	Nil.
Flash point (open cup)	396° F.
Burning point (open cup)	460° F.

The Engineering Experiment Station secured the use of a pressure distributor with a heater attachment for several of the counties and furnished an engineer to advise regarding the application of the oil. The conclusion of the Highway Commission regarding oiled roads are:

The treatment can be considered only as an efficient method of maintenance and must be repeated annually.

The preparation of the road surface preliminary to oiling is of great importance.

It is advisable to use a good quality of oil, even at an increased cost.

Better results are obtained by heating the oil.

PARKING IN CITIES.

The Express-Advertiser of Portland, Me., has obtained information from the city clerks of several cities of between 50,000 and 100,000 population concerning the methods which they employ in providing parking spaces for automobiles. Four of the cities have given information as follows:

Manchester, N. H., is considering the advisability of allowing the use of a park or common in the heart of the city just off the main street as a parking place for automobiles.

New Bedford, Mass., last year assigned as a parking place a vacant lot which is styled the "municipal lot," which is located in the business center of the city and is about 191x142 feet in size. No charge is made for the use of this.

Peoria, Ill., has selected two of its extra wide streets and marked off the center of the same so that cars can be parked therein. About 50 automobiles can be accommodated in each block. On other streets, cars can stand for one hour at a time, except on Sundays and holidays. There are also some one-way streets on which cars are parked.

In Springfield, Mass., automobiles are allowed to park on the main street for 10 minutes only and on certain streets they are not allowed to park within 100 feet of the main street, although on most streets this distance is only 50 feet. On all except the main street, vehicles stand all day and all night without any prohibition, which is the cause of much complaint on the part of merchants whose patrons are thus prevented from alighting at their doors, but the police are powerless to prevent it. A committee of the city government is now amending the rules of the road and proposes to limit automobiles and other vehicles to 20 minutes on the side streets.

HAULAGE METHODS AND COSTS ON OHIO ROAD WORK.

In the construction, during the past two or three years, of the National Road through Ohio, the haulage of materials has been a difficult problem for the contractor. R. N. Waid, Division Engineer of the State Highway Department, in a recent paper before the Ohio Engineering Society, described the various methods of transportation employed by the contractors.

As the contracts have been large, ten of them exceeding $90,000, the contractors' force and equipment have necessarily been likewise. Four chief means have been employed in hauling materials. About one-third of the materials required to construct the 90 miles now completed have been delivered by teams, another third by industrial railway, and the remaining third about equally by motor trucks and traction engines. Each method appears to have its sphere of adaptability, but it is not the same for all.

The traction engine train is perhaps the least adjustable to varying conditions. It appears best adapted to fairly level, straight roads, which have not been paved, where the average haul is not less than one-half mile. The cost of hauling by this method on this work was about 24 cents per ton-mile.

The team haul disclosed no new results, though a great deal of material was handled in this way.

Hauling by motor trucks was quite successful and many contractors employed the method. Wet weather was a handicap and trailers were not very successfully employed. The large 7-ton trucks at first employed did not work as well as the lighter 3-ton trucks, and several of the heavy trucks were exchanged for lighter ones. No motor trucks were used where the average haul was less than 2 miles. The cost per ton-mile where the trucks were successfully used was about 14 cents.

In the 24-mile concrete section west of Zanesville and on the 7-mile brick section west of Cambridge, a 3-foot gauge industrial railway was used to transport materials. The two chief troubles encountered consisted in operating over grades which exceeded 5 per cent and in maintaining the track after it had been down over winter. The actual cost of operation and maintenance was about 11 cents per ton mile. The heavy investment for equipment, however, largely offset the low cost of operation.

On most of the work an attempt was made to keep careful cost data. This was only partially successful, but some of the most reliable figures are given by Mr. Waid, as follows:

The average cost, to the several contractors, for grading, was approximately 40 cents per cubic yard. All classes of excavation for drainage structures cost on an average $1.15 per cubic yard. Mixing and placing concrete in the small culverts cost $1.60 per yard. The cost of laying rubble masonry was $1.85 per cubic yard. The labor cost for building forms for the concrete culverts was $1.22 for each cubic yard of concrete. The cost of placing the reinforcing steel in the drainage structures was 55 cents per 100 pounds.

SPRINGFIELD GARBAGE DISPOSAL REPORT

Past and Present Methods of Disposal in Springfield—Factors in Selection of Method—Variations in Amount—Income Obtainable.

The Bureau of Municipal Research at Springfield, Mass., of which J. H. Hutchinson is manager, has recently made public a report upon the subject of disposing of the garbage of that city, with the idea that it may serve as a basis for arriving at a decision upon this point. The report is based upon investigations of methods and results in a number of other cities.

From 1907 to 1911, Springfield disposed of its garbage by turning it over to farmers for feeding to hogs, the city receiving for this an average of $4,263 a year over and above expenses. From 1914 to 1916 the garbage was disposed of by reduction by a private company under a contract that netted a loss to the city averaging $3,971 a year.

In connection with this contract for reducing the garbage, the report states that "The city failed to deliver the garbage that it said it would; the plant was not of a capacity to treat the garbage delivered to it; the garbage was not reduced and disposed of 'in a manner not injurious or prejudicial to the public health'—it was so unsanitary and offensive that an injunction secured by adjacent property owners resulted in its closing operations in the middle of 1916. The company went into bankruptcy, and early in the present year the plant was bought by the city for $5,453.37." For several months after the closing of the plant in June, 1916, the city buried its garbage on the almshouse grounds and a public dump.

This was objected to strongly and discontinued at the end of the year, and since then the garbage has been given to farmers. Much of the garbage is hauled to the State street station, where it is dumped and gathered by farmers; although in the case of certain farmers outside the city, the garbage is hauled to the city limits in city wagons by city teams, and the farmers there hitch their own teams to the city wagons and remove the garbage to their farms, the city horses bringing back the city wagons returned at the same time by the farmers.

The bureau concludes from its investigation that it is not necessary for the city to incur any loss, but states that "Garbage is a commodity for which, in its raw state, there is a demand, and for which purchasers are willing to pay a price. It is also an article that, after being treated by certain processes, may be changed into commodities that have a market value, and from which an income may be received. * * * It should be realized that a city that gives away garbage is giving away that which is of value."

In addition to this matter of revenue three other factors were considered fundamental in a choice of method of disposal: (1) Cleanliness and freedom from nuisance; (2) adequacy for disposal of all garbage produced, and (3) economy of construction and operation. A method that does not promote the health of citizens, and the cleanliness and sanitation of premises is a failure. A method that abates a nuisance in one part of the city and creates a nuisance in another part of the city is a waste of money. A method may be economical in respect to both initial investment and expense of operation, and may bring in the greatest income from sale of products; yet if it is in any respect offensive or injurious to citizens, it is not a proper method of garbage disposal.

Given proper sanitary conditions and results, that plant is best which causes least expense to the citizens; and the bureau concludes that the expense of disposal and possibly even the combined cost of disposal and collection should be entirely taken care of by revenue from the disposal of the garbage.

Adequacy means that the method of disposal must be adequate to handle not only the average amount of garbage from the present population of the city, but the maximum per capita rate of garbage from the maximum population of the city at any time while that particular disposal method or plant is in use. In considering this point, it assumes the life of the plant as being 20 years, and therefore that its capacity should be adequate for the population 20 years hence. The population of Springfield in 1915 was 102,971, and it is estimated that by 1940 the population will be 248,236, which is exactly double the estimated population for the year 1920.

In the matter of amount of garbage, the bureau makes the very interesting statement that, while the amount of garbage produced increased 8 per cent from 1915 to 1916, the amount produced in the first five months of 1917 was 10 per cent less than that produced during the similar period of 1916; this being total amount and not per capita, from which it follows that the amount of garbage being produced per capita this year is more than 10 per cent less than it was a year ago. "The decrease in 1917 is due, in all probability, to the high prices of food stuffs, to the wide-spread agitation for conservation of food stuffs, and to the increased collection by farmers. * * * Without doubt the effect of conservation will continue for a longer period than the war. With the return of normal conditions, however, the production of garbage, both in total and per capita, will again increase." In the matter of amount of garbage the report quotes a number of figures from other cities, most or all of which have previously been given in Municipal Journal, these showing the amount in pounds per capita per year to vary from 157 in New York to 282 in Washington, D. C. That in Springfield was about 240 pounds in 1915 and 251 pounds in 1916, and the estimate of capacity required for the future is based on an average of 245 pounds.

The variation of garbage production with the seasons of the year in the city of Springfield is shown by the accompanying table, which also gives the variations for seven other cities. It appears from this that the maximum monthly rate in Springfield could probably safely be placed at 12% of the total amount, although in Cincinnati the maximum monthly rate reaches almost 14 per cent of the annual:

Seasonal Variations in Amounts of Garbage.

Month	Cleveland Per cent	Columbus Per cent	Cincinnati Per cent	Washington Per cent	New York Per cent	Detroit Per cent	Chicago Per cent	Springfield Per cent
January	7.00	6.28	5.34	7.50	6.30	7.30	5.50	6.89
February	6.00	5.67	5.20	6.60	5.70	5.85	5.30	6.32
March	7.80	6.36	5.16	7.20	7.00	6.60	5.30	6.78
April	7.85	6.70	6.92	7.55	8.10	7.55	6.50	6.83
May	7.50	7.78	6.80	8.45	9.25	8.20	7.40	7.65
June	9.00	7.82	9.08	7.80	9.37	7.90	8.10	7.49
July	8.65	9.40	12.40	9.20	9.55	8.80	10.50	8.41
August	9.60	12.24	12.10	11.70	9.86	10.40	12.40	10.71
September	10.70	12.95	13.80	10.90	10.89	10.10	12.30	11.17
October	9.80	9.20	8.20	8.50	9.18	10.30	10.60	9.66
November	8.30	7.83	7.50	7.40	7.80	8.10	8.60	9.61
December	7.60	7.77	7.50	7.20	7.00	8.90	7.50	8.40
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

The daily rate also shows variations, and from an inspection of the figures for Springfield, it was concluded that the capacity of the plant should be 210 per cent of the average daily production for the year. In this connection the bureau calls attention to the fact that in making the contract between the city and the reduction company which has been disposing of the city's garbage, provision was made for a capacity of only 50 per cent excess over the average daily production of the year previous to the contract, and 25 per cent in excess of the average daily summer delivery of the previous year; provisions which it believes to have been quite inadequate.

The report discusses the advantages and disadvantages of the several methods of dumping on land, disposal by sanitary fill, burial, plowing into the soil, incineration, reduction, and feeding to swine. All of these have been discussed several times in Municipal Journal. In connection with incineration, it was concluded from the facts available that the lowest probable cost of disposal of garbage by incineration is $1.50 per ton, this including operating cost, maintenance and repair. Concerning the utilization of heat from incinerators for developing power, it is stated that the Milwaukee plant earns about $10,000

a year by operating a pumping station, and Minneapolis about $27,000 a year by heating and lighting buildings and lighting streets. The Chicago Waste Commission is quoted as stating that it has not been easy to work out an economical arrangement for the use of steam from incinerating plants because of the infrequency of the period of need of steam by a plant coinciding with the period of operation of the incinerator. In Montreal, where a refuse destructor is used in connection with a municipal electric light plant, the former is operated only at night, when additional power is required by the lighting plant.

Assuming that Springfield could secure an income from the heat of an incinerator plant, it is estimated that it would reduce the expense by from $6,000 in 1920 to $10,000 in 1935, but would leave a net cost of incinerating the garbage varying from $26,000 in 1920 to $33,841 in 1935. Incineration is regarded as sanitary and disposing of garbage without odors, which permits the locating of incinerating plants in the central part of the city and decreasing the length and cost of haul.

As to reduction plants, the report states that "In theory reduction plants should be operated in a sanitary manner, without creating a nuisance and without carrying offensive odors. In practice they are not so operated." Of 21 cities containing reduction plants of which inquiries were made, 8 did not report as to odors; 10 reported the presence of odors to a greater or less degree; one did not answer as to this point, but stated that the plant was 40 miles from the city, and one city reported no odors, although Springfield officials visited this plant and noted odors coming from it. Four of the cities questioned operate their own plants, and all of these report odors.

The cost of reduction plants is given as varying between $1,500 and $3,000 per daily ton capacity, averaging $967, omitting one of the plants, which cost $4,400. Estimating the cost of operating the reduction plant at $2 per ton, and charging depreciation on a 20-year life and interest at 3½ per cent, it is estimated that the total expense would be $45,283 in 1920 and $69,568 in 1940. Cleveland reports a profit of $1.49½ per ton of garbage; Columbus, $1.836 per ton, and Dayton, 63 cents. Based on present prices, the bureau believes that $3 per ton would be a fair amount to use in figuring revenue from a plant at the present time and for the next few years; on which they calculate a net profit of $329 in 1920 and $21,659 in 1940.

After citing experiences of a number of cities in selling garbage to farmers or others who use it in feeding hogs, and especially the city of Denver, in which the company receiving the garbage collects it for nothing, it believes it possible for Springfield to obtain at least $1 per ton for its garbage. Worcester and Brockton, Mass., and New Haven, Conn., are cited as cities that operate municipal farms, where garbage is fed to hogs, and it is stated that Worcester derives from its pig farm a revenue of $6.85 per ton of garbage, based on present prices. An estimate based on prices of a year or two ago gives $3.65 per ton.

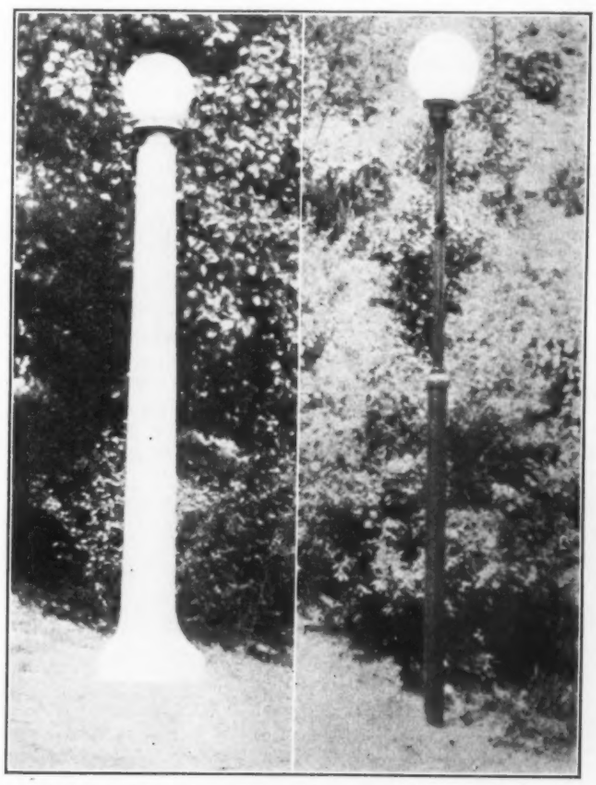
Among the cities which turn the garbage over to hog raisers the following prices are received for the garbage delivered: Grand Rapids, 45 cents per ton; Lowell, $1.25 a load; Somerville, 80 cents per cord foot; Cambridge, 70 cents per cord foot; Colorado Springs' garbage is collected, and $1,440 paid for the privilege, estimated at a total value of $11,040; Denver has the garbage collected for nothing, a service estimated to be worth $64,500.

In conclusion the report suggests that the city might advantageously dispose of its garbage by incineration, by reduction, by selling to farmers, or by feeding to hogs on a municipal farm. Whatever the method of disposal, the city should realize that it can receive a revenue from the garbage rather than paying for its disposal, and at the same time can insure that the process shall be sanitary and inoffensive. "This means that the garbage will not be incinerated, because no city has been found where the revenue of an incinerating plant has met even the direct cost of operation, without considering charges for interest and depreciation. It means also that the city will discontinue giving to farmers that for which they should pay. If farmers desire to have the garbage of Springfield they should pay to the city of Springfield all that the garbage is worth.

"Finally, it means that Springfield will not consider any proposal whereby it will be required to give the garbage to a concern and then pay the concern any part of the cost of reduction."

PARK LIGHTING IN ST. LOUIS.

The water department of St. Louis has recently improved the lighting in the parks and grounds near Chain of Rocks, Baden and Bissell's Point, by installing 80 one-lamp standards equipped with Mazda lamps. The lamps are all on single-light standards of which 53 are of reinforced concrete and 28, in the park, are of wrought iron pipe. The former, eight feet high, square in section with chamfered corners, made by employes of the department, were cast in wooden forms two at a time, the concrete ingredients being two parts Meramec sand, screened to remove particles over one-eighth inch in size; four parts of crushed limestone, three-quarter inch and smaller; one part of cement and ten pounds of hydrated lime per sack of cement. The forms were removed after 24 hours and the surface rubbed to an even finish. The reinforcement was four five-eighths inch deformed bars. The wires are run in a conduit through the center of the post. Each standard was set in concrete poured after the post was placed, anchorage



Concrete Standard. Steel Standard.
LAMP STANDARDS, CHAIN OF ROCKS PARK.

being secured by the reinforcing bars in the post extending down two feet into the footings. Each standard is provided with a cast iron cap and fitter, aluminum bronzed, which holds the 100 or 200-watt Mazda lamp and the 7- by 14-inch globe.

The iron standards, all made by the city, are of three-inch wrought iron pipe seven feet long and one 1½-inch pipe 3.5 feet long, connected by a standard reducing coupling and capped by a malleable iron fitter which holds the 100-watt Mazda lamp and the 6 by 12-inch globe. Each post is set in concrete, so that the center of the globe is 9.75 feet above the ground. The cost of each concrete standard, complete with fitter, globe and lamp was $11.28; of each iron standard complete, $5.82; no setting charges being included. All lamps are on 110-volt alternating current circuits, there being 19 circuits in all, seven lamps ordinarily being placed in parallel on a circuit. All wiring is in lead covered cable placed about 21 inches underground and protected by one-inch plank. Under roadways and wherever much digging will be done, fiber conduit laid in concrete is used. The total cost of this work has been $6,580, and it is estimated 60,000 kilowatt-hours of current will be used in operation during a year.

LOW WATER CONCRETE BRIDGES.

In the arid region of the southwestern states the bridge engineer encounters a peculiar condition. Practically all creeks and smaller rivers are dry eleven months out of the year and in the remaining one month carry an excessive amount of water only for a day or two at a time. A stream will suddenly change its character from a mere trickle or a dry bed to a torrent ten to twenty feet deep and then back to its original state in twenty-four hours. It is only in extreme cases that the flood period extends over one or two days.

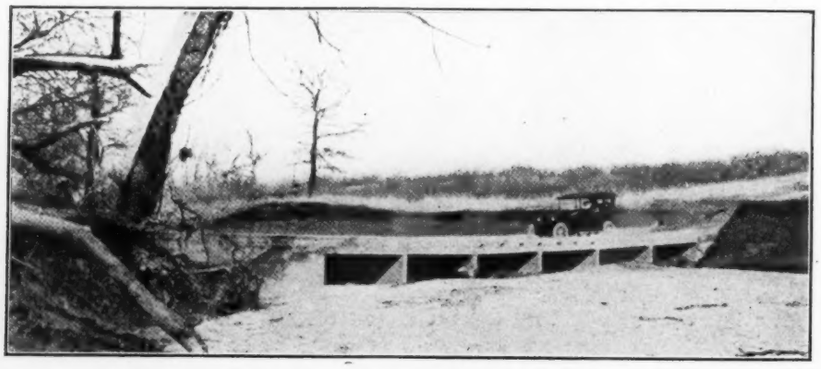
Such a condition makes a bridge in which two to five thousand dollars has been invested comparatively useless during the greater part of its life and as little money is available for roads and bridges in these regions, economy must be practiced. Moreover, because of the large amount of debris carried by flood water, the floor of an ordinary highway bridge must be above the flood level, which fact necessitates approaches with wing walls and abutments.

Economy has forced engineers to design a bridge which gives service most of the time without too large an expenditure. The result is the so-called "low water bridge."

A low water bridge in its commonest form consists of several short reinforced concrete spans which clear the ordinary dry or low water flow. These spans are carried on piers which rest either on footings if a rock bed is available, or on a concrete slab when the foundation is sand or gravel. In the latter case, an apron or cut-off wall extends into the stream bed to protect the slab from scour.

In the bridge illustrated by the accompanying photograph, the piers rest on a slab 60 feet long placed in the bed of the stream.

During high water these bridges are wholly submerged, therefore guard rails or hand rails are omitted to prevent the lodgment of detritus or suspended matter. In many cases the center of a bridge is lower than the ends.—Concrete Highway Magazine.



LOW WATER REINFORCED CONCR ETE BRIDGE OVER SANDY CREEK, OKLAHOMA.

ASPHALT PAVEMENT CARRIES HEAVY TRAFFIC.

The traffic at the intersection of Fifth Ave. and 42nd St., New York, is supposed to be the heaviest in the United States. The Fifth Avenue Association periodically takes traffic counts at this and certain other corners on that avenue, and endeavors to regulate traffic in Fifth Avenue and vicinity so as to use these several avenues to the best advantage of all concerned. One direction taken by such effort is to endeavor to divert to parallel streets those vehicles whose business does not require them to use Fifth Avenue.

According to the latest count taken by this association, 16,960 vehicles of all kinds passed along the avenue between 41st and 42nd Sts. in the ten hours from 8 a. m. to 6 p. m., 8,513 of these being north bound and 8,447 south bound. Included in this number were 1,296 motor busses. At this point the Fifth Ave. roadway is 55 feet wide and is paved with sheet asphalt, 1½-inch top on 1½-inch close binder, with a 6-inch base of concrete, laid in 1913; previous to which year a sheet asphalt pavement had done service for 17 years before requiring renewal. For carrying this heavy traffic the mixture was changed somewhat from the standard, as is shown by the accompanying table.

	Standard	Fifth Avenue
Asphalt	10.5%	11.7%
200 mesh	13	17.3
100 "	13	10
80 "	13	22
50 "	24	23
40 "	11	5
30 "	8	8
20 "	5	2
10 "	3	1

The asphalt used was Trinidad asphalt, and it will be seen that the amount used was a little more than 10% greater than that required by the standard mixture. The aggregate also is seen to differ quite a little, but when taken by groups the difference is seen to be not so great. Combining the 200-mesh and 100-mesh, the standard requires 26%, the Fifth Ave. pavement used 27.3%. Of the 80, 50 and 40-mesh, the standard is 48%, Fifth Ave., 50%; of the 30, 20 and 10 mesh, the standard amount is 16%, Fifth Ave. pavement 11%. It is seen that the greatest difference between the standard and the Fifth Ave. pavement is in the much less amount of 10-mesh and 20-mesh material and the greater amount of 200-mesh material. This is apparently in conformity with the theory that 200-mesh material can not be crushed any finer by traffic and thus forms an indestructible element of the pavement, whereas the coarsest material is in particles which may be broken by the weight of traffic and loosened from the surface of the pavement, thus leaving small pockets in the surface at which disintegration may begin.

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Contributed Articles and Reports.

Contributions suitable for this paper, either in the form of special articles or as letters discussing municipal matters, are invited and paid for.

City officials and civic organizations are particularly requested to send Municipal Journal regularly their annual and special reports.

Information Bureau.

Municipal Journal's Information Bureau, developed by twenty-one years' research and practical experience in its special field, is at the command of our subscribers at all times and without charge.

UTILIZING GARBAGE.

The garbage pail as an index of waste of food, and the duty of each city official to reduce to a minimum the contents of the pails in his city was discussed by us editorially in the May 31st issue. A few days ago Mr. Hoover sent a letter to a number of cities asking them to give him figures of the amounts of garbage collected by them recently as compared to those collected during a similar period last year, presumably with a view to learning to what extent waste of food was being diminished. And within a few days the garbage pail has received further attention from the authorities, the Secretary of Agriculture having made two suggestions in the matter. The first of these is the use of garbage for feeding community herds of pigs, as described elsewhere in this issue. The other is the following circular letter addressed to the mayors of all large cities which have no reduction plants:

"This department desires to bring to your attention the matter of the conservation of the garbage in your city. At the present time there exists throughout the world a shortage of both fats and fertilizer materials. This situation promises to grow more serious as the war in Europe continues. It is therefore a matter of prime importance that all available sources of both of these materials should be used to the best advantage. Garbage contains on the average about 2 per cent of grease and about 20 per cent of tankage, the latter having valuable properties as a fertilizer material. Any method of disposal of garbage in large cities which does not recover both the grease and the tankage is uneconomic and particularly deplorable in the present circumstances. We wish, therefore, to urge upon your consideration the advisability of so treating the garbage from your city as to insure the recovery of its valuable constituents. That this may be made a source of profit to a municipality has been proven by numbers of cities in the United States where municipal rendering plants have been erected, and in a number of others, private plants are now operating and paying dividends on the investments. We will be glad to furnish you with any further information at our disposal on the subject, upon request."

A garbage reduction plant is a very expensive one to construct, and it requires several months—possibly a year—to build one. It is not, therefore, a matter to be decided upon hastily, and we advise each city to give careful consideration to all phases of the subject before it adopts such a plan. For instance, the fact that the amount of garbage is known to have been reduced by 20 to 25 per cent this year in several cities very probably means that the fats and other matters in the garbage that furnish the valuable products are being reduced by at least double this percentage—enough, possibly, to wipe out all profit from the process. It was generally believed that utilization of European garbage could not be made with profit during ante-war periods because the Europeans were not so wasteful of food as Americans; and if Americans cease to be wasteful, the same impossibility of profit will obtain here also. We do not believe that even the Secretary of Agriculture would advise cities to go into a losing venture for the purpose of saving an uncertain amount of food waste, with a possibility (a hope, let us say) that the war will be over before the plant could begin to operate. The hog seems to us a more favorable method of utilizing garbage.

AUTOMOBILE TYPHOID.

In the July 26th issue of Municipal Journal reference was made to the danger that typhoid might increase among city dwellers through their drinking, during automobile tours, water which was polluted. That such danger exists is confirmed by an illustration which has just come to our notice. During the months of August, September, October and November, 1916, the typhoid cases in St. Louis were found to have totaled 429, as compared with 162 for the same period of the year previous. An investigation was made to determine the cause, and it was found to be quite certainly proved that the principle cause was the use of water from contaminated wells and springs in the territory immediately surrounding the city by residents thereof who were in the habit of motoring from the city and making frequent stops at the numerous inns and resorts on the main traveled roads. The water supplies at 51 of these places were tested by the bacteriologists of the water division, and in practically every instance B. Coli were found present. Investigation of the individual cases of typhoid developed the fact that almost all of them had drunk the contaminated water at some of these resorts.

WATER CONSUMPTION OF PUBLIC SCHOOLS.

The stand taken by the city of Lawrence, Kan., in requiring the Board of Education to pay for water consumed by the public schools, as described in Municipal Journal last week, is to be highly commended. The claim of the board that this will place an additional burden upon the taxpayers will not stand a minute's consideration. In the first place, all the water pumped and delivered is paid for by the taxpayers, whether as part of the school budget or otherwise.

But much more important is the fact that the total amount so paid for will, in all probability, be reduced by metering the schools and requiring the Board of Education to pay for the water passing these meters. In the majority of cases, if not all, where the matter has been investigated it has been found that schools using water through unmetered connections are wasting it in the most extravagant fashion. In some cases the schools

have been using almost one-tenth of the entire supply of the city. Water in toilets and sinks has been allowed to run continuously week in and week out, while fountains, showers and other uses of water add to the thoughtless but expensive waste. When the meters and water bills have brought this home forcibly to the school board, they have been able to cut the consumption by 75 to 90 per cent.

For this reason it seems probable that, instead of increasing the cost of water to the taxpayers, metering the schools will decrease the consumption and thus lessen the cost. As Mr. Dunmire, head of the water department, says: "Free water and economy can't be found together."

LICENSE FEES IN WISCONSIN CITIES.

The University Extension Division of the University of Wisconsin has collected information concerning the purposes for which a license fee or permit is required by the cities of that state; remarking in connection with its report on the subject that "Undoubtedly many cities can materially increase their revenue either by increasing the occupations licensed, or the amount of the license fee charged, or both."

It secured information from 84 cities, including all but 8 of those of 5,000 population or over. Forty-nine subjects were named by one or more cities as subject to license or permit, which will be named in alphabetical order. In addition, the state requires a license fee of $5 a year for selling cigarettes, $10 for pharmacists' liquor licenses, and $2 for hotels and restaurants.

Auctioneers. Fees charged by the day, $2 to $100 plus 7% of the gross amount of sale. Seven cities charge by the year, the fee ranging from $5 to $300.

Automobiles for hire, $1 to $25 a year.

Bill posters, $1 to $50 a year.

Billiard tables, $1 to $10; one charges $15 for a billiard hall.

Bowling alleys, $1 to $20; only four over $10.

Building within fire limits, $1 by two cities; sliding scale by two.

Building movers, 50 cents to $10 a month.

Circuses, $1 to $500. Twenty-seven charge a minimum of $10 or less, sixteen having a sliding scale. Three charge $100 or more, and eleven a maximum of $100 or more.

Dance halls, six cities only, $1 to $10 a year.

Dogs. Males, $1 to $3; females, $2 to $5.20.

Drain layers, $50 to $10; $5 being common.

Drays, $1 to $5 for a single dray; $5 to $10 for a double dray.

Electricians, $1 to $10 a year; one city, $1 a building.

Entertainments, exhibitions, menageries and shows, $1 to $50 per day.

Excavations of streets and sidewalks, 50 cents to $10.

Fairs, $1 to $25.

Fortune tellers, clairvoyants and astrologists. Prohibited in many cities. In seven cities charges range from $1 to $10 a day.

Hay weighers, 10 cents a load in four cities.

Junk shop, $5 to $25 a year.

Liquor saloons, $200 to $1,000 a year; most of them $500 or under.

Medicine distribution, $1 to $5 a day, and $10 a year.

Merry-go-rounds, $1 to $50 a day; $10 to $25 a week.

Milk and cream, 25 cents to $2; or 10 cents to 25 cents a cow.

Moving picture theatres, $1 to $100 a year; two cities, 20 cents a seat.

Pawnbrokers and loan brokers, $10 to $125 a year. Milwaukee, $5 for loan brokers and $150 for pawnbrokers.

Peddlers and vendors, $5 a month to $50 a day. Several cities charge low rate for peddler with pack, higher for push cart, still higher for horse and wagon, and highest for two-horse team or automobile.

Plumbers, $1 to $25 a year.

Pool tables, $1 to $15 a table.

Runners and solicitors, $1 to $30 a year; one city, $1 to $3 a day.

Scavengers, $1 to $50.

Second-hand stores, $1 to $25.

Sewers, making connections with. 50 cents to $25; or $1 to $2.50 per connection.

Sidewalks, construction of. $1 to $25 per year.

Stands, markets, candy, pop corn, lunch. $5 to $25 a year, or $1 to $3 a day.

Tallyhos. Three cities, $3 to $50.

Theatres, exhibition halls and opera houses, $1 to $150 a year, or $1 to $5 a night.

Transient merchants, $1 to $35.

Vehicles. Three cities charge $5 to $25 for omnibuses, and $3 to $20 for other vehicles.

Water service pipes, persons laying. Five cities charge fees of $1 to $6 for each connection.

No city reported license fees for clubs, dyehouses and cleaning establishments, steam engineers, public garages, or slaughter houses, although these were mentioned in the questionaire; and only one charges for motorcycles, drivers, and storing gunpowder.

EMULSIFIED ASPHALT FOR CONCRETE ROADS

The use of emulsified asphalt for maintaining concrete roads is suggested by H. B. Bushnell, division engineer of the Illinois State Highway Department. He gives as the advantage of this that no heating kettle is required and that the work can be done even when the surface of the pavement is wet, as it is not necessary to have the sides of the crack dry, as is the case when asphalt or tar is used. About a gallon of emulsified asphalt thinned with a pint of water is mixed with a cubic foot of stone chips which, for large cracks, are graded from ¾ of an inch down to dust, and for smaller cracks from ½ or ⅜ of an inch down. Small pebbles and sand also have been used with good results. Experience has shown that the aggregate should be so graded as to reduce the voids to a minimum. The asphalt is poured upon the aggregate and the whole thoroughly turned by hand. The mixture is then poured into the crack and is well tamped to insure against settlement.

The water in the emulsion evaporates after a short time and leaves the crack filled with a water proof mixture of asphalt and stone chips.

RESURFACING OLD CONCRETE WITH NEW.

The road commissioners of Wayne Co., Michigan, last year resurfaced an old concrete road by placing on it a 7-inch surface of new concrete. This construction was believed to be novel and was regarded by the commissioners as an experiment rather than something to be generally advocated, but recent inspection shows it to be in excellent condition and promising to wear well. In addition to placing the new surface, they at the same time widened the road from 16 feet to 20 feet.

The road on which this work was done was a section of Grand River road built in 1910, which had become rough and uneven. It had been built with two-course construction on a crowned sub-grade, the bottom course consisting of 4 inches of a 1:2½:5 mix and the wearing course of 2½ inches of 1:2:3 mix. It had been laid in 25-foot sections with quarter-inch tar paper joints extending entirely through the concrete. This road carried 7,444 vehicles during the week of August 17, 1912, and, as the surrounding territory has built up rapidly, it is believed that the traffic at present is double this.

Concrete was added on each side of the road to provide the additional 4 feet of width, and at joints where the concrete had spalled to a considerable extent the old concrete was broken away to give a bond and new concrete added, with expansion joints left as in the original construction, and the whole top surface of the old pavement was brought to an even grade. Before placing the new surface, the old concrete was sprinkled with water and a mixture of Tarvia A and Tarvia X was sprinkled on while hot, spreading into a very thin layer which was immediately chilled. This layer pre-

vented the adhesion of the new concrete surface to the old concrete. The new surface consisted of three inches of 1:1½:2½ concrete, using for the coarse aggregate Michigan trap rock graded in size from ¼ inch to 1 inch, and washed and screened bank sand for the fine aggregate. Reinforcement was used consisting of No. 26 triangular wire mesh. The expansion joints in the top course were made to coincide exactly with those in the bottom course, and were formed by inserting a piece of wood 3x4 inches over the joint and removing this, after the surface had been finished by a Baker automatic finishing machine, and inserting in the joint opening armor plates with expansion felt. The surface was covered with earth which was kept on 12 days and sprinkled daily, and traffic was not permitted to use the road until 25 days after the last concrete had been placed.

POWER AND WATER BUREAU SHOPS OF LOS ANGELES

Municipal Warehouse, Machine Shops, and Central Power Receiving Station—Testing Electric Meters—Rack Holding Five Thousand Meters—Automobile Control.

By C. W. GEIGER.

On a seven-acre tract in Los Angeles, Cal., there has been constructed a municipal warehouse, machine shops, garages, and central power receiving station for the Bureau of Power and Water, for which it is claimed that for up-to-date equipment and efficiency of operation they have no equal in the United States.

All the buildings with the exception of the garage are built of concrete and are absolutely fireproof. The greater part of the surface of the tract is concreted, which eliminates all mud and dust.

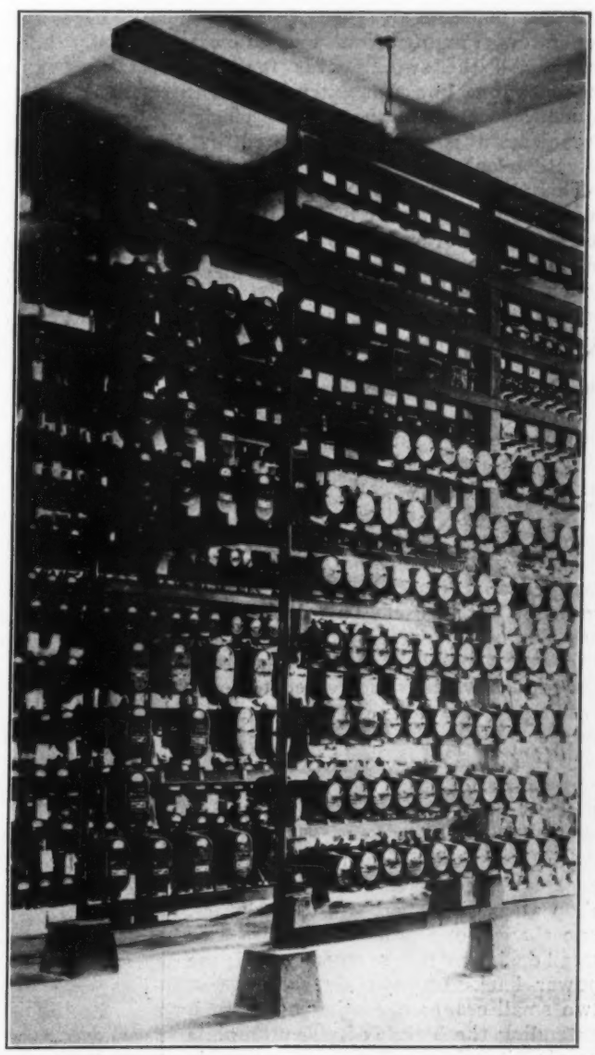
The health and efficiency of the workmen have been taken into consideration, the buildings being all perfectly ventilated and well lighted by both large window space and electric lights, there being twenty-five electric lights installed in the electrical repair department. Wash-basins, soap and towels, clothes lockers, and lavatory are provided and kept in a sanitary condition. The tract is fenced in a part of the way by high retaining walls. Both day and night watchmen are employed. This is very necessary, as a large amount of valuable material is stored on the tract.

A two-story building 80 by 120 feet and equipped with a power elevator is used as a warehouse. A temporary building erected when the aqueduct was in course of construction is also used as a warehouse, while a large quantity of material is piled up in the yard. A spur track enters the building, making it possible to unload directly into the warehouse. A concrete platform extends the length of the warehouse, where much of the supplies are reloaded for transportation by motor truck to other points as needed. At present the warehouse is supplied with sufficient supplies to take care of any ordinary construction work, or to warrant any new construction or repairs. Supplies are shipped here in quantities, and then redistributed to various branches of the organization. This has been found to be the most economical way of handling supplies.

When supplies are ordered for any of the different branches, the foreman of the branch signs a requisition. Five copies are made, and a complete record is kept of everything taken out. One copy is kept by the foreman, two by the warehouse foreman, and two are sent to the main office and kept on file in case any question arises later.

The local offices occupy the front part of the first floor of this building. Immediately over the offices on the second floor is the laboratory, which is one of the most important departments of the ogranization. This department has been equipped with three test benches for testing the accuracy of the meters. The meters are considered the pocketbook of the institution, and special effort is made to keep them in perfect condition. These test benches were built in the electrical re-

WAREHOUSE AND LOADING PLATFORM
At right of picture. Temporary warehouse at left. In foreground, portable reel of 100 ft. of 3-in. fire hose.



PART OF METER RACK HOLDING 5,000 METERS.

pair shop. Five meters can be mounted on each bench at once, thus saving considerable time. Each meter as it comes into the testing room from the warehouse is stenciled by an hair brush with a serial number, class number, and "L. A. City."

After leaving the testing room, the meters are mounted on an adjustable meter rack which has a capacity of 5,000 meters and can be enlarged easily. The meters are slipped over hooks especially designed to fit over the edge of two-inch angle irons. The angle irons are supported by pipes extending from the floor to the ceiling. Meters are fastened to both sides of the angle irons. There are five rows of these racks with 12 angle irons to each rack.

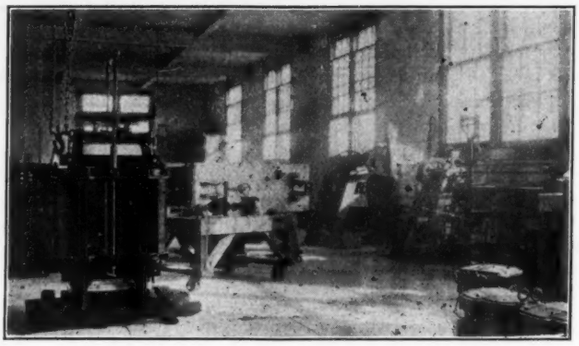
The foreman of the laboratory has designed a box for transporting meters that is a great improvement over the usual method of transportation. Meters are very sensitive and great care must be taken after they are tested not to jar them. Each box has 12 compartments which are lined on all sides with ¼-inch felt packing, in which the meters fit snugly. They are placed in the compartments upside down, which allows the moving elements to remain off the jewels while they are being transported. Considerable other equipment is being installed in the laboratory which will be ready for use soon.

The electrical repair department occupies the upper floor of the machine shop. In this department repairs are made on all types of transformers, motors, and generators ranging from one kilowatt to 5,000 kilowatts. All the switchboards for the substations, and the telephone line that extends the entire length of the aqueduct, were built here. The efficiency of the entire organization is greatly enhanced by the use of this private telephone system.

This department is equipped with two coil-winding machines, used for winding coils for both transformers and motors. A switchboard saw also is installed for cutting into proper sizes slabs of marble and ebonite which are used in switchboards. All three of the last named machines were built by this department, when the workmen were not busy doing other needed work.

An opening is cut in the second floor, and over this is mounted a five-ton crane which moves on a track mounted overhead. This is used for lifting the heavy transformers out of their cases and hoisting them to this floor for repairing and overhauling. Considerable of this kind of work has been done lately. Recently three 250-kilowatt transformers have been completely rewound, and six 600-kilowatt and six 300-kilowatt transformers were dismantled and reassembled so that they could be put in use. This department has also reconstructed two 80-kilowatt and one 100-kilowatt direct-current generators which were rented to local moving picture firms for producing direct current at the studios. The shop was also used to overhaul the electrical equipment of the old aqueduct so that it could be put to service again.

On the first floor of this building is a well equipped machine shop. In this shop at present there are three lathes, one shaper, one radial drill press, two small drill presses, one emery wheel, one power hack-saw, one air compressor, two small cranes operating on a track extending the length of an automobile repair pit, where all repairs are made on the 70 automobiles operated by the power and water department. Just opposite the machine shop is a large garage built of brick. Every automobile (both passenger and truck) reports at the garage every night unless too far away. Each car as it returns at night is checked in and the driver reports the condition of his car, and if any repairs are needed, they are made at once, so that the car will be ready for the driver the next morning.

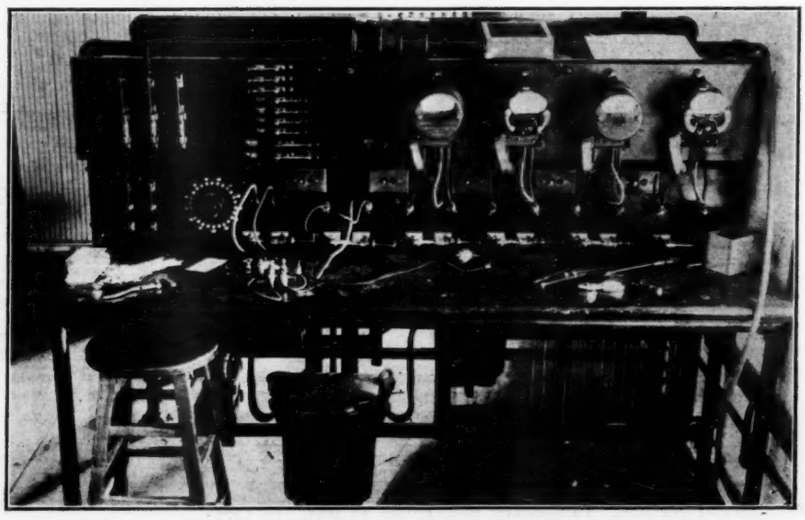


INTERIOR OF ELECTRICAL REPAIR SHOP.
On either side of the superintendent are the coil-winding machines.

A complete record is taken and kept of each car, such as the amount of work done, the amount of oil and fuel consumed, etc. Each driver signs a slip each morning on taking his car out. A record is taken of the time the driver leaves and returns, the reading of the speedometer when he leaves and when he returns, and a record is made each day of the department the car is working for, such as the shop, service, soliciting, etc.

All these cars are under the direct supervision of what is called the Transportation Department. This department is housed in a special office, built in the center of the yard and equipped with windows extending on all sides. A large blackboard is built in this office for keeping the records of each automobile. On this board is marked each day the number of each car working, the driver's name, the reading of the speedometer in and out, the time in and out, and the name of the department the car works for. At nine o'clock at night, when all trucks are supposed to be in, the record on the blackboard is taken down on cards, and the board cleaned for the records of the next day.

All automobiles are under the control of this department, and are rented out to the Power and Water Departments, with or without the services of a driver.



ONE OF THREE METER-TESTING BENCHES.

At present there are 38 passenger cars and 32 trucks. The trucks are from one to four tons capacity. All trucks are operated on distillate, using gasoline to start with. They consist of Morelands, Autocars, Republic and Vim. The passanger cars are used by the executives, solicitors, trouble shooters along the transmission line, etc.

The most economical record made in operating a passenger car was 2.17c per mile. 1884 miles in one month were made with this car at a cost of $41.24, with an additional $2.36 for overhead expense, making a total of $43.60.

The costs of operating the trucks, including the salary of the driver, vary from 9c to 18c per mile. A four-ton Moreland made the lowest record. It was operated for one month at a cost of $120.13. Deducting $96.00 salary of the driver, it cost $22.47 for fuel and overhead for the month. The truck made 1223 miles, using 210 gallons of distillate and 5 gallons of gasoline. The gasoline was used for starting.

The gasoline and distillate are stored in 500-gallon tanks buried under the ground. All oil and fuel is purchased of the lowest bidder under guarantee.

The tires of the various cars are numbered and checked from day to day. If any new tires are required, the driver must sign for them. Old tires that are worn badly are tagged with the number of miles made on them. If they are beyond repair they are sold to the highest bidder. As the parts of the cars wear out, they are replaced, so that the driver is always assured that his car is in first class condition. Great precaution is taken to make everything and everybody efficient in order to set a good example to the residents of Los Angeles.

The central receiving power station is built on this lot and is of the latest and most modern construction. All equipment is of remote control; that is, the operator has all circuits before him on an operating bench. Here all switches and necessary connections are made. The power comes in at 110,000 volts and is transformed to the voltage necessary for distribution to the various sub-stations and consumers. A part of the north and south sections of the city as well as part of the industrial section is supplied with power, while a line runs to San Pedro and Pasadena. All surplus power is turned over to the Edison company for distribution. For this surplus power the city has received $162,234.20 from May 1 to July 20, 1917.

COMMUNITY PIGGERIES.

The United States Department of Agriculture has made public, probably with a view to encouraging imitation, information concerning a community piggery in Hull, Mass. The commendable feature, from the point of view of the Department, is that pork is produced without the use of grain for feed, thus conserving the grain and produced valuable fat.

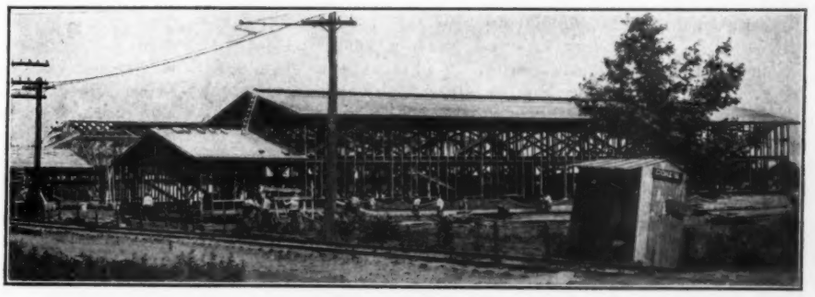
This community piggery of 325 hogs was undertaken in response to appeals for more meat production, and the scheme is reported by the Department and the Massachusetts Agricultural College to be practical.

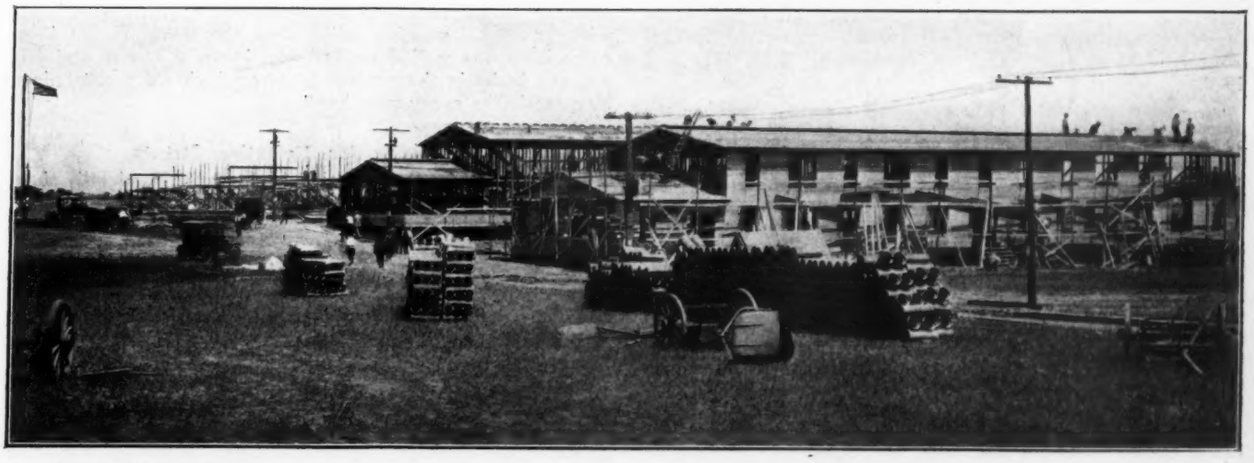
The town's Committee of Public Safety advanced the money to buy the young pigs, which were taken at cost by citizens. The land for pasturing and housing the hogs was given free, so the only cost was for two large hog houses. One man feeds and manages the entire herd. Each day the uneaten garbage is taken away before any more is fed. All hogs are inoculated against cholera and are kept under sanitary conditions.

When the hogs are ready for market the unit cost of care and feeding will be shared equally by the owners, and this sum plus the original cost of the pig will be the only expense to the owners. The Public Safety Committee is holding a surplus of young sows for breeding, since it plans to continue the system. Citizens of this town extol the advantages of its garbage disposal and recommend it for other places of similar size.

BUILDING THE CANTONMENT AT LOUISVILLE, KY.

At the right is seen the framework of a company barrack; at the bottom a similar one with the siding on. The kitchen extensions are seen at the left of each of the buildings. Plans of these buildings were given in the July 12th issue of Municipal Journal.





Courtesy, Indianapolis News.

The WEEK'S NEWS

State Road Legislation in Pennsylvania and Wisconsin—Washington's Milk Problem—Vacation Typhoid in Iowa—Canton's Water Shortage—Gas Standard Reduction Opposed in Indiana—Penitentiary for Indianapolis Police Chief —City Managers in Portsmouth, Va., and Goldsboro, N. C.—Los Angeles Fires Engineers—The Six-Cent Fare in New York State—Street Railway Strikes in Seattle and Tacoma, Wash.—Norfolk Begins Work on Port Development—Bayonne Does Not Want City Terminal.

ROADS AND PAVEMENTS

Pennsylvania Highway Legislation.

Harrisburg, Pa.—After cutting half a million dollars from the two-million-dollar item for constructing and maintaining state-aid highways in the state highway bill, governor Brumbaugh recently approved the measure. Items approved are: Construction of state highways, $6,000,000, including routes in boroughs where state highway route is improved to borough lines; state-aid highways, $1,500,000; condemnation and purchase of turnpikes and toll-roads, $500,000, some of which will be paid for at once; township "dirt roads," $1,873,470.40, provided that not more than $1,350,000 shall be paid out before June 1, 1918. The bill, as approved, provides for a total of $10,373,470.40. The governor also approved an omnibus bill providing for additional appropriations for a number of extra routes. In signing this measure, he said that the state main highway system should be less than 5,000 miles unless the people bond the state for highway improvements and use all current revenue given to highways for maintenance purposes only. The bill, he said, shows a net increase of 4.1 miles, and he denounced the way routes were added to bills and favorites played in the legislature. The omnibus bill makes changes in twenty-five routes.

Year's Highway Legislation in Wisconsin.

Madison, Wis.—"The legislature of 1917 was signalized by the enactment of more constructive highway legislation than has been enacted at any session in years. The joint highway committee of the two houses gave deep thought to highway legislation and the three joint committee bills which were enacted mark a very distinct advance over previous legislation." This is the statement of A. E. Hirst, engineer for the state highway commission, in reviewing the legislature's work. "The most important enactment was the state trunk highway law (Bill 444, S., Chapter 175). This law was enacted to enable Wisconsin to take advantage of the law providing for federal aid for roads, which federal aid in the period from 1916 to 1920, inclusive, totals nearly $2,000,000. In brief, this law provides that the state highway commission shall lay out a system of 5,000 miles of main highway, interconnecting every county seat and city of over 5,000 in population in the state. This system of roads is called the state trunk highway system and on it must be expended all construction funds (amounting to $6,000,000) available from the federal government, the state and the counties in 1918, 1919 and 1920.

"The State and Federal aid available is divided between the counties, one-third on the basis of area, one-third on the basis of road mileage, and one-third on the basis of valuation. The maintenance of this system after May 1, 1918, is to be performed by the counties under the control of the state highway commission, the funds for the maintenance being provided from automobile license fees, which also furnish the state's one-third share of the cost of construction.

"This law, providing as it does for a comprehensive and well laid-out system of trunk lines for the concentration of construction on this system, and for the adequate maintenance of unimproved portions of the system pending its final reconstruction, should give Wisconsin a system of well maintained roads connecting every important center of population. If well administered, notwithstanding the fact that the funds provided for construction in the next three years are by no means adequate to complete the system, the law will produce a tremendous improvement in practically all of the main lines of travel in the state and will make them travelable with safety and comfort by midsummer of 1918.

"Immediately upon the passage of the state trunk line bill it became evident that many of the towns and counties were deliberately abandoning all projects for construction and maintenance on roads which they assumed would be on the state trunk system. Money previously available for its improvement under the state aid law was moved to other roads in many cases. The joint committee considered this matter and there was formulated and passed bill 650, S., which provides that one-half of the state aid funds available in each county must hereafter be expended on the state trunk line system until this system is completed in each county.

"The bill also provides that towns and villages not served by the trunk line system should receive in proportion to their valuation the other half of the state aid funds, but that the place of expenditure in each town and village should be selected by the county board. The law, together with the trunk line law, provides for a greater concentration of expenditures for the next two or three years on the main lines of travel and at the same time insures that every town and village will get a fair deal by getting less important roads improved if they do not happen to be directly benefited by improvements upon the state trunk line system.

"In addition the laws providing for bonding counties for state aid highway construction were simplified and improved, and while no great activity is anticipated in the bonding of counties during present war conditions, there will be great activity when conditions resume the normal and the legislature has adjusted the county bonding provisions and made them workable by the passage of bill 649, S. Town bonding for state aid highway construction has been eliminated, owing to the impossibility of guaranteeing state aid on town bond issues under the new laws. Bill 590, A., was also passed. This provides that cities of all classes may receive state aid on streets and roads lying in the outlying portions of them. The bill as passed meets the views of the League of Wisconsin Municipalities and will go far toward solving the problem of improvements in the outlying sections of cities, which improvements have been impossible to finance under either the state aid law or under the existing laws for city paving, and it is expected that in a few years the unsightly mud holes on the outer edges of some out cities will be done away with. Some minor changes were made in the common road laws of the state, but none of importance or far reaching effect. In general, the legislature confined itself to the problem of securing the improvement of the main lines of travel, and it is believed that wonderful results were accomplished, especially in improving conditions as to maintenance. The feature of this far reaching legislation was the fact that all of it passed both houses practically without opposition, indicating that the work of the joint committee was well done and met in an adequate and fair manner faults in the present system which were recognized by practically every member."

City Liable for Defective Streets.

Portland, Ore.—Pronouncing a clause in Portland's charter, exempting the city from liability for defective sidewalks or streets, void, the Supreme Court at Salem, in an opinion written by chief Justice McBride, reversed circuit judge Kavanaugh, of Multnomah county, in the case of a suit in which the plaintiff was awarded $6,350 damages against officials for injuries sustained on a crossing over East Salmon street. The officials made defendants in the case were: former mayor Albee, commissioners Bigelow, Brewster, Dieck and Daly, and engineer Dater, and the court held they were not liable as it was not shown that the defectiveness of the crossing was due to their negligence. The decision says: "The city is out of the case

as it stands here, neither party having appealed as to it, but it may well be doubted whether it is competent for the charter-making power to take away from the plaintiff a complete remedy against the city, which is always solvent and responsible, and whittle it down to a point where the plaintiff will have a partial and doubtful remedy against city officers or against a subordinate officer whose position is, perhaps, a little lower than a deputy inspector, and a little higher than that of dog catcher. To the writer it seems that such a conclusion is contrary to justice. This case was begun upon the theory that both the city and the mayor and commissioners, who constitute the council, were liable, the city for the fault of its officers and employes in not using reasonable diligence to ascertain and remedy defects in walks, and the commissioners and city engineer for a like negligence on their part; but in our view, while they might have been properly so joined, the facts which would have justified recovery against the city might not justify a recovery against the councilmen or city engineer. The city, under the doctrine of a respondent superior, would be liable for the negligence of any officer authorized by it to see to the repair of the street, or perhaps, for the fault to designate such an officer. The mayor and commissioners, on the other hand, as heretofore observed, are not liable if they have used reasonable diligence to provide funds for such repairs, and to see that the system of inspection and report of disrepair of walks is provided for and competent persons designated to make such inspections and repairs, unless the defect is so glaring and notorious and so long continued, as of itself to create a presumption of knowledge of its existence, which is not the case here." In absolving the officials from damages the court, in part, says: "There is no charge that defendants were negligent in not providing funds or in failing to provide material, or that they were guilty of negligence in the selection of employes or of a lack of diligence in requiring reports as to the condition of streets. None of these conditions are shown, but on the contrary, it affirmatively appears that a reasonable diligence has been exercised in all these respects."

SEWERAGE AND SANITATION

Milk Control Obstructed by Litigation.

Washington, D. C.—Washington faces a grave milk problem because of low standards of quality, which threaten a disastrous effect upon the lives of infants, according to a statement by the health department, which declares that much of the milk being sold at the present time is "far below standard" and is "filthy and decomposed." The hands of the department are tied because of the pendency of litigation in the United States Supreme Court with respect to the enforcement of the federal food and drugs act of June 30, 1906. The health officer also is equally helpless, it is stated, with respect to the enforcement of the local milk act of 1895, the fact that a case is pending in the District Court of Appeals, involving the validity of the act, preventing him from proceeding under it or under the regulations made by virtue of it. The only partial remedy available, according to the health department, is for persons who are interested in the quality of milk they use to consult the records of the health department so as to know the standing of their own particular milk dealer. Methods employed at various milk establishments are described in reports of dairy inspectors and made public by the health officer. A bacteriological examination showed that the raw milk used by one establishment for pasteurization, where testing was particularly crude, contained 23,200,000 bacteria per cubic centimeter, with 480,000 bacilli of the colon type and 100,000 streptococci. The finished product, sold as pasteurized milk, contained on the day of inspection 310,000 bacteria per cubic centimeter, 8,200 bacilli of the colon type, and 10,000 streptococci. Bacteriological examinations of the bottles at this establishment, supposed to be ready for filling, showed that they contained large numbers of bacteria. The composite sample of milk taken from twelve cans, each containing ten gallons, showed 970,000 bacteria per cubic centimeter. The sample taken from the dumping vat, into which such milk was poured, showed 2,480,000 bacteria per cubic centimeter, and a sample taken from the vat upstairs, to which the milk had been pumped, showed 5,100,000. The bacilli of the colon group, which numbered 6,300 per cubic centimeter in the cans, increased in the lower vat to 71,000 and in the higher vat to 160,000. A quart bottle of "pasteurized" milk from this establishment, filled and capped ready for delivery, showed 78,000 bacteria per cubic centimeter with 500 of the colon type, and 100 streptococci. Concerning another establishment, the inspector reported: "On the day of inspection, on account of the souring of some stored milk and subsequent shortage on the routes, the first milk that arrived was dumped into a bottling machine, immediately bottled and, although it was raw milk, was labeled 'pasteurized' and allowed to go out as such." Samples from a pint bottle of raw milk sold as pasteurized milk showed that it contained 21,100,000 bacteria per cubic centimeter, with 260,000 of the colon type and 100,000 streptococci.

State University Laboratory Fights Vacation Typhoid.

Iowa City, Ia.—The havoc that has been wrought in Iowa in past years by typhoid fever introduced into communities by persons who have acquired the disease by drinking polluted water on their vacations has led the water chemist and bacteriologist for the state board of health, J. J. Hinman, of the state university, to warn all vacationists against drinking untested water. Requests for examinations of such water supplies are being received daily. In a statement, Mr. Hinman said: "The state laboratories do not have authority to examine samples of water from other states, although they may examine, in the interest of public health, any supply within the state. Upon request, however, the names and addresses of the officials who are charged with the examination of water supplies of other states will be furnished, and application for the examination of water collected in their respective jurisdictions can then be made to them."

More Contract Troubles on Passaic Valley Sewer.

Newark, N. J.—Following the recommendation of chief engineer Brown, seizure of the contract held by John G. Tierney for laying the outfall pressure pipes in New York Bay was authorized by the Passaic Valley Sewerage Commission, and secretary Joseph H. Quigg was instructed to notify Tierney to discontinue work at once. Unsatisfactory and irregular progress on the part of the contractor is given as the cause. The work is to be taken over by the sewer board and may be completed by it under the direction of chief engineer Brown, or a new contract let to the lowest bidder. The cost will be charged to Tierney. This action by the commissioners has been theatened for several weeks. Tierney has denied having abandoned the contract, although little, if any, progress has been made this summer. His contention is that, as the work advanced into the bay, he encountered conditions which called for costly foundation work not contemplated when the contract was made. The contract to Tierney was let December 6, 1913, for $437,500. The work was to have been completed more than a year ago. It is said to be about two-thirds finished.

Organizations Unite for Public Health Work.

Fargo, N. D.—The North Dakota Public Health Service is the name given to the organization finally effected in the past few weeks by the state board of health, the state public health laboratories and the Anti-Tuberculosis association. These organizations have repeatedly asked the state legislatures to aid them in the furthering of their plans for more sanitary conditions in the state, but as this help has not been given they have joined forces to carry on the work as far as possible themselves. Plans for the summer include sanitary surveys with the basic idea of preventing typhoid fever and tuberculosis and stimulating towns and counties to employ a city or county nurse. The North Dakota Public Health Service has employed and has at its service for the state an experienced and registered nurse, Miss Mabel Fodness, who has begun her work in the public

health laboratory at the University of North Dakota. She will be especially available for the work of the Federation of Women's Clubs. At the request of the mayor and the local board of health of Park River, the North Dakota Public Health Service has begun a sanitary survey of that city at a cost of from two to four cents per capita. Three men are at work on the Park River survey and five will be added later. The survey will be completed in about a month's time. A house to house canvass is being made, with special emphasis being laid on typhoid, cholera infantum, tuberculosis and all the diseases which are carried by flies or transmitted by polluted water. Placards were placed on unsanitary privies, and large posters warning against the permitting of the breeding of flies were placed in conspicuous places. Two public meetings were held, at which stereopticon lectures were given. The schools of Park River and the dairies have been subject to thorough investigation.

WATER SUPPLY

Purchase of Waterworks Voted Down.

Bayonne, N. J.—The voters, at a special election, have disapproved, by a vote of 2,704 to 2,143, the proposal by which the city was to purchase the property of the New York & Jersey Water Company at a cost of $1,466,848. The company owns only the mains and the opponents of the measure pointed out that the supply is somewhat uncertain as to purity and quantity.

Electrolysis Blamed on Railway.

Trenton, N. J.—That Trenton can be relieved of the expense incident to electrolysis, providing the street railway companies take precautions, and that the latter in turn would be great savers by elimination of this waste of current, is the opinion of E. E. Brownell, the Philadelphia expert. Because of electrolysis, it is claimed the city has been put to enormous expense for replacing water services. The condition is particularly bad along several divisions of the Trenton and Mercer County Traction Corporation, while the Public Service and the New Jersey and Pennsylvania Traction Corporation are also to blame to some extent. However, according to the city commission and the findings of engineer Brownell, the Trenton Trolley Company is the worst offender. He believes that not only will Trenton benefit materially, but the guilty corporations, after repairs have been made, will find that they are saving much money by conserving the current which now escapes and damages city property. The local traction company will not admit its responsibility regarding the damage. Because of the prevalence of electrolysis on North Clinton avenue, the water department is almost constantly engaged placing new house connections. It was stated that in one instance recently a new pipe laid in that vicinity lasted only eight weeks. Owing to the necessity for constantly cutting into the North Clinton avenue pavement to make these repairs, the street surface is in bad condition, but commissioner Fell does not feel like having a new pavement laid, because it would be practically throwing away the property owners' money.

Water Famine Until New Pumps Are Completed.

Canton, O.—With the city in the grip of one of the worst water shortages in several years, mayor Stolberg issued an order prohibiting sprinkling for a period of two weeks. The mayor decided that drastic action was necessary so the city can be furnished with water sufficient for fire protection and to provide all consumers with water for necessary purposes. More than one-third of the city was without water for several hours one night and those districts that were fortunate enough to have water had very little. The condition existing is due entirely to the waste of water by consumers, officials assert. The pressure on this day at noon was down to 70 pounds, and at 7 o'clock in the evening it had dropped to about 16 pounds. In a statement, the mayor said: "The key to the entire water situation here is a distribution reservoir capable of holding at least 24 hours' supply. If council had gone through with legislation for such a reservoir two years ago the city would be safe from any shortage now." The department records show that it is pumping at a rate of about 17,000,000 gallons of water daily now, which is nearly double what it was a few years ago. By the time the ban on sprinkling is raised, however, it is expected that the new waterworks pumping station northeast of the city will be in operation and adding 3,000,000 gallons of water daily to the supply. The station is now practically completed and seven shallow wells have been drilled near the site. Work on the construction of a main to connect the wells with the distribution system of the city is being pushed and it will soon be ready for use. A second new well drilled recently at the Union dam property in the southwest end has been connected with the pumping system. This well has a capacity of about 1,000,000 gallons daily. The first well was put to pumping several weeks ago.

STREET LIGHTING AND POWER

Does Not Have to Rebuild Burnt Plant.

Waterville, N. Y.—The Public Service commission has rendered a decision in the appeal taken by the village trustees of Waterville, declaring that the Waterville Gas & Electric Company will not be compelled to rebuild its plant, which was destroyed by fire September 22, 1916. It is based on the opinion that it would be unjust to compel a corporation to go to the expense of rebuilding its plant when for years it has been doing business at a loss. Public service corporations are compelled at times to furnish service without adequate compensation, but in this case, it is held that an order instructing the Waterville company to resume its gas business would mean that the consumers of electricity would be compelled to assume the expense of the losses on the gas operation. The case came before the commission on a complaint of the village trustees. The village has 1,500 inhabitants, and has been diminishing in population for years. There are no industries, and prior to the fire there were about ninety consumers of gas for heat and light.

Indiana Cities Fight Gas Standard Reduction.

Indianapolis, Ind.—William A. Bond, counsel for forty-one cities in the state, opposing the petition of the Indiana Gas Association for a reduction in heat units required in artificial gas and an added increase of twenty-five per cent in rates, has filed his brief before the public service commission, attacking the jurisdiction of the state commission in the case. Under the petition filed by the gas companies heat units produced by cubic foot of gas would be reduced from 600 to 550 units, thus lessening the quality of the product. This alone would mean an increase of 8¾ per cent in rates. Attorney Bond says the "commission does not have any right, power or authority to determine such matters by wholesale, as no such power or authority is vested in the commission by law, and if it were it would be extremely bad policy to pursue such a course. If the privately owned utilities of the state succeed in getting the commission to act in their behalf by a joint petition to increase rates or modify some service then the letter and spirit of the statute is plainly disregarded and they will have and retain a stronger hold upon the public throat than they held prior to the enactment of the Public Utilities Law. Will the commission become the willing tool of the privately owned utilities of this state, and, by an unauthorized act, smite the public by wholesale and in a matter wholly contrary to the statute?" Bond claims that municipal councils are the proper tribunals to decide on the quality of service to be rendered, as in the reduction of heat units, and that each company be required to file a separate petition before the state body for authority to increase rates. The cities have also protested individually in briefs filed by the officials. The following cities will be affected by the petition for a surcharge on gas bills: Aurora, Bluffton, Bedford, Bloomington, Crawfordsville, Columbus, Connersville, Decatur, East Chicago, Elkhart, Evansville, Franklin, Ft. Wayne, Frankfort, Goshen, Greencastle, Hammond, Huntington, Indiana Harbor, Jeffersonville, Lebanon, Logansport, Laporte, Michigan City,

Mishawaka, New Albany, Ossian, Peru, Princeton, Plymouth, Rich Valley, Rochester, South Bend, Terre Haute, Valparaiso, Warsaw, Whiting, Washington and Lawrenceburg. The following companies have joined in the petition: Consumers Gas Company, Citizens Gas and Fuel Company, Columbus Gas Company, Central Indiana Lighting Company, Evansville Public Corporation Company, Elkhart Gas and Fuel Company, Franklin Water, Light and Power Company, Goshen Gas Company, Greencastle Gas Company, Huntington Light and Fuel Company, Hydro Electric Light and Power Company, Indiana Public Service Company, Interstate Public Service Company, Laporte Gas Company, Northern Indiana Gas and Electric Company, United Gas and Electric Company, Rochester Gas and Fuel Company, Valparaiso Lighting Company, Warsaw Gas Company, Washington Gas Company and Lawrenceburg Gas Company.

An organization of fifteen Indiana cities, to oppose all proposed increases in electric and artificial gas rates, has been formed. John A. Ross, mayor of Seymour, was chosen president of the association of cities. Other officers elected were: Charles S. Barnaby, president of the Chamber of Commerce at Columbus, vice-chairman; Carroll R. Woods, secretary of the Shelbyville Chamber of Commerce and originator of the idea of organizing the cities, secretary; Samuel Spohn, mayor of Goshen, treasurer. A committee of five was appointed to appear before the public service commission at the hearings consisting of D. W. Fickle, former mayor of Logansport; William A. Bond, city attorney of Richmond; Alfred Bavis, president of board of works of Richmond; Samuel Spohn, mayor of Goshen, and John A. Ross, mayor of Seymour. This committee also will employ legal counsel and an engineer to represent the cities in the fight against the increase in electric rates, which is being petitioned for by the utility companies. The following cities have been enrolled as charter members of the association: Batesville, Columbus, Connersville, Frankfort, Franklin, Martinsville, Noblesville, Seymour, Tipton, Mt. Vernon, Winchester, Huntington, Bloomington, Goshen, Richmond, Logansport and Shelbyville. Each of the cities, with their commercial organizations, will appropriate $100 to pay the cost of the fight to be made before the public service commission. In explanation of its request for a 25 per cent surcharge, the gas association makes the following explanation:

"Owing to the scarcity of materials and labor and the extraordinary cost of everything that enters into the manufacture and distribution of gas, it is felt that something should be done to temporarily relieve a situation that has become severely acute and burdensome to a hazardous extent; such condition, unless relief is granted during the period of its continuance, threatens not only the curtailment of present service and efficiency, but as well the ability to finance necessary works betterments, improvements, enlargements and extensions of mains, and if continued for any considerable length of time, actual insolvency of utilities.

"In this connection it is desired to remind your honorable body that the existing burdensome condition is not of recent origin, but that to the contrary the gas companies during practically the last year, and more pronounced during the last seven months, have been compelled to pay unusual and extraordinary prices for gas coal, steam coal, coke, labor and all other materials required for the manufacture and distribution of gas. In the investigation made by the various companies it has been found that they are unable to contract, except at a great advance over normal prices, for these various materials, and from statements frankly made by a number of companies selling such supplies there is absolutely no hope held out for lower prices during the continuance of the war. Even where contracts exist it has been impossible in a great many instances to secure the delivery of the commodities contracted for, necessitating purchasing on the open market to prevent being compelled to close down plants, at prices in some cases as high as the following:

"Gas coal, $6; steam coal, $4.75; coke, $8.50; gas oil, .094 cents per gallon.

"The percentage of increase of prevailing prices over those of normal times of the principal supplies, materials, etc., required to operate, shows an approximate average increase as follows:

"Percentage of increases of prevailing prices over normal prices—Gas coal, 233; coke, 150; oil, 100; steam coal, 189; labor, 30; taxes, 40; firebrick, 80 and cast iron pipe, 84."

Interconnection of English Electrical Systems.

London, England.—Much attention is being given to the investigations and recommendations of the committee appointed by the board of trade to report upon the possibilities of extending and interconnecting various sources of supply and providing economical and convenient electric power for British industries. The full report of the committee is not yet available, but a great deal of discussion upon the subject has recently appeared in the English press. It is suggested that a national power-distribution system is as important as national railway, road, telegraph, and telephone systems, and stress is laid upon the advisability of insuring that there shall be an adequate and economical supply of power for all classes of consumers in the United Kingdom, particularly industries that depend upon a cheap supply of power for their development. The intercommunication of existing municipal electric plants and the establishment of central generating stations are among the questions now being given practical attention. A preliminary statement recently made by the committee of investigation embodies the following conclusions: (1) That when British industry is subjected to the test of keen international competition after the war, its success will depend upon the adoption of the most efficient methods and machinery, so as to reduce manufacturing costs as much as possible. (2) That a highly important element in reducing costs will be the general extension of the use of electric power used in industry that the average output per head, and as a consequence the wages of the worker can be raised. (3) That the present system under which a supply of electricity is provided in a large number of small areas by separate authorities is the result of a policy adopted at a time when the applied science of electrical engineering was in its infancy, and is incompatible with anything that can now be accepted as a technically sound system. (4) That the interconnection of existing supply stations recommended by the board of trade in their letter of May 25, 1916, however desirable in itself, cannot alone meet the requirements of the situation. (5) That a comprehensive system for the generation of electricity, and where necessary reorganizing its supply, should be established as soon as possible.

FIRE AND POLICE

Police Chief Sentenced for Election Corruption.

Indianapolis, Ind.—Chief of police Perrott has been sentenced in the federal court to four years in a federal penitentiary and to pay a fine of $1,000. The policemen convicted, Pope, Sanders, Hulse and Stringer, were treated more leniently, since, though their guilt was undoubted, they "acted under the stress of authority." They were sentenced to six months in the Marion county jail, and to pay fines of $50 each. The sentence of Herman F. Adam, former inspector of weights and measures, was two years and six months in the penitentiary and a fine of $500. Mayor Bell and thirty-one other officials and politicians are facing indictments on similar charges of corruption.

A Rural Fire Department.

Hollansburg, O.—What is claimed to be the first rural fire department in the United States has been put in service at this town, fifteen miles northeast of Richmond, Ind. The company is to serve farmers of Wayne County, Indiana, and Darke County, Ohio, living within a radius of five miles of Hollansburg. An automobile truck of the latest style and equipment has been bought by farmers and will be maintained by annual dues of the membership. If the department is called to extinguish a fire at the home of a member no charge is made. If the call comes from a farmer who is not a member the service will cost the caller $50. The truck is provided with two large chemical tanks, small chemical extinguishers and 200 feet of hose. The machine can make a run within its territory in ten minutes. Five members of the company in Hollansburg who understand the machine's operation thoroughly live within a square of the firehouse and others are nearby.

State Inspectors Find Many Fire Hazards.

Columbus, O.—Fire hazards of which citizens have been entirely ignorant in all communities in the state and in scores of instances endangering big stocks of foodstuffs have been reported by inspectors who have been at work for several weeks to state fire marshal Fleming. More than 1,000 orders to correct evils have been issued through 230 fire insurance company inspectors whose services are

given the state during the period of the war. Almost all the wholesale grocery warehouses, 1,100 grain elevators, 500 grist mills and other food storage buildings have been examined already. In a large building adjoining a large wholesale grocery warehouse with a $25,000 stock of goods the inspectors found a carload of "strike anywhere" matches. They were in an inflammable building. In another large building housing $100,000 worth of foodstuffs the automatic sprinkler system was entirely out of order. Inspectors found 90 tons of peanuts stored in a ramshackle barn about which were all sort of fire hazards. Another bad practice discovered is keeping automobiles in barns stocked with hay. "A barn is no garage. Keep the auto out in a separate building with a concrete floor that is rat proof. Keep gasoline in a safe place," says the instruction from the fire marshal's office.

Fight Difficult Oil Fires.

Philadelphia, Pa.—Two terrific explosions which occurred within fifteen hours at the Point Breeze plant of the American Refining Company resulted in total damages of $700,000 and injuries to scores. The second explosion occurred while the firemen were still at work. The detonation rocked the southern section of the city. When the second explosion occurred more than a dozen fire companies were still pouring powerful streams into the tangled mass of hot iron left by the morning fire. The second call drew back many companies which had just returned to their stations from hours of heroic battling with the first fire. About twenty-five ambulances treated firemen during the day. The second explosion occurred in one of the stills in the same region which had been burning all morning. The still which exploded contained about 10,000 barrels, or 420,000 gallons, of oil. The plant's facilities enable the removal of products when occasion requires to points inside of the works, distant from the fire.

MOTOR VEHICLES

A New City Garage.

Akron, O.—The city council, in passing the semi-annual budget, has provided for a city yard. The city yard will contain a garage for the repair and storage of city autos. Gasoline which has hitherto been obtained simply by requisition at any garage and charged up to the city will hereafter be obtainable only at the city garage by city coupons. Mileage reports will be made at regular intervals and by means of them steps will be taken to prevent joy riding in the city-owned machines.

Rebuilt Truck in Service.

Oak Park, Cal.—The new rebuilt fire truck has been delivered to the local fire station on Fourth avenue and is now in service. The apparatus consists of motor tractor and truck equipped with ladders, hooks and chemical tank. It was rebuilt at the corporation yard under direction of the chief.

New Truck Installed.

Chester, Pa.—The Franklin Fire company, of this city, has now in service the new 10,000 gallon Seagrave centrifugal combination motor pumping engine and hose car. The machine is equipped with Sewell cushion wheels and a complete fire-fighting outfit. Under the direction of John T. Bauer, chairman of the purchasing committee of the fire company, the engine was given its official test pumping water from the Delaware river. With a suction lift of 12 ft. 3 in., the centrifugal pump gauge showed 120 lbs. pressure and four full streams of water were discharged through four 100 ft. lines of 2½ in. hose in 22 seconds. Through four lines 100 ft. each, 2½-in. hose, siamesed into a deluge set with 2-in. nozzle, net pump pressure 120 lbs., nozzle pressure 90 lbs.; 1,128 gal. of water was discharged per minute; suction draft 12 ft. 3 in. Through four lines of 2½-in. hose 100 ft. each, each having separate nozzles, sizes 1 inch, 1⅛ inch, 1¼ inch, 1¼ inch, 1,168 gals. of water was discharged per minute, at 120 lbs. net pump pressure, suction draft 14 ft. 4 in. Through three lines of 2½-in. hose, each 100 ft. siamesed into a water tower, 1¼-in. nozzle, 200 lbs. net pump pressure, nozzle pressure 170 lbs., gallons discharged 771, suction draft 10 ft. Through four lines of 2½-in. hose, nozzles 1 inch, 1⅛ inch, 1¼ inch, 1½ inch, pump pressure net 100 lbs., suction draft 6 ft. 5 in., 1,397 gal. of water was discharged per minute.

GOVERNMENT AND FINANCE

New City Manager Appointed.

Portsmouth, Va.—W. B. Bates of Roanoke, Va., has been appointed city manager of Portsmouth for a term of three years beginning August 1, 1917, at a salary of $4,000 to begin with for the first year. He received the votes of councilmen Bunting, Claude, Hanvey and Herbert. Councilman Culpepper voted for P. L. Looney of Norfolk and councilmen Morris and Dashiell voted for T. B. Shertzer, the former city manager, whose dismissal had caused indignation throughout the city, to fill the position for the coming five months. Mr. Bates, who is 37 years old, was born in Richmond. His present residence is in Roanoke, although he has been employed for some time in Richmond. He is an engineer, connected with the Southern Steel Products Company of Richmond, and was assistant city engineer in Richmond for several years, going from there to Roanoke, where he was made city engineer. Meanwhile the citizens' disgust at the action of the council majority in dismissing city manager Shertzer has taken active form. Judge Kenneth A. Bain has granted a petition signed by 586 qualified voters asking a special election to decide on the incorporation of the recall feature in the city charter, with a view to the recall of the council members. An election is to be held September 18. As a mark of confidence and appreciation, a handsome gold watch was presented to Mr. Shertzer by several hundred citizens before he left the city.

A Woman Mayor in the South.

Moorehaven, Fla.—Mayor Marion N. Horwitz, the first woman to hold such a position in the South, has taken office after making a strong fight against her own election. She finally accepted the office after receiving 75 per cent of the votes cast at the election recently. She has been strong in her stand against a woman holding public office, but was the sole nominee for the mayoralty, and a delegation of the leading citizens pleaded with her to accept the office, presenting a petition which had been signed by a majority of the voters. Mrs. Horwitz has announced to the new council that she stands for progressiveness, elimination of party lines in municipal politics, and a referendum on all legislation of a municipal character, sanitation, schools, police regulation, and the proper and immediate financing of the new city of the Everglades.

Propose Municipal Loans to Industries.

Portland, Ore.—That the city under the state constitution is prohibited from advancing money to finance any privately owned manufacturing industry is the opinion submitted to the council by city attorney LaRoche. This opinion was given as a result of a request made some time ago by the East Side Business Men's club that the city issue bonds to raise funds for loans to manufacturing industries in this city. Commissioner Kellaher, of the department of finance, made the statement that he favors an amendment to the state constitution authorizing cities of 100,000 population or more to issue industrial bonds for the purpose of assisting manufacturing plants within their boundaries. Mayor Baker referred the matter to commissioner Kellaher, who will act with city attorney LaRoche in the preparation of such an amendment.

Shakeup in Engineering Department.

Los Angeles, Cal.—The reorganization of the city engineer's department has been ordered by the board of public works with an initial reduction of thirty men in the staff, effective August 1. Further changes will be announced later to go into effect September 1. In addition to dropping thirty positions, with a saving of more than $30,000 a year, the board designated R. W. Stewart, chief engineer of bridge and tunnel construction, as office engineer, to have charge of the general conduct of the drafting de-

partment without increase in pay. Stewart will take over many of the duties formerly performed by city engineer Hansen when he was chief deputy. The first reductions ordered in the engineer's department were as follows: Street planning department, eleven men, leaving twenty-five in the department; sewer planning department, nine men, leaving fifteen; storm sewer department, one man; bridge department, one man; surveying department, two field parties numbering eight men. Three small autos will be purchased to make it possible for the remaining twelve field crews to do the work of the present fourteen crews. Action follows the removal from office of city engineer of Homer Hamlin by the board. Hamlin had been asked to resign but he refused. The board in a statement said: "We recognize that he gave the city valuable service during the past years. However, we were convinced that the time had come for a change. In recent months there has been an entire lack of harmony between the engineer and the members of the board." The real cause of the trouble is attributed by Mr. Hamlin to have been his refusal to accept a macadam pavement because of the contractors not complying with the specifications in regard to stone used. The board disagreed—but the pavement, which the board accepted on Jan. 4 last, is already disintegrating.

City Manager Appointed.

Goldsboro, N. C.—Edward A. Beck, of Pennsylvania, has been selected by the Goldsboro board of aldermen to fill the position of city manager, at a salary of $275 per month. He will assume his duties September 1. Mr. Beck is a graduate of Purdue University.

Budget Board Makes Investigation.

Lansing, Mich.—Michigan's budget commission chosen by Governor Sleeper to investigate the system of accounting for the state and report its findings to the next legislature, is proceeding with its work. Three of the members have attended important meetings in the upper peninsula. The entire commission is now travelling through New York, New Jersey and Maryland, to see how the budget systems of those three states work out. One of the most important problems in state institutions for the last few years has been the question of the purchase of supplies. For a time each institution bought its own stuff, independent of the others. Soon it was found that exorbitant prices were the result. To obviate this difficulty, the stewards of the institutions voluntarily organized an association known as the Institutional Buyers' Association. Co-operation brought down prices and secured better results. Commissioners Hinkley, O'Brien and Lord went to investigate the association's methods at a meeting held in Marquette. Secretary George Lord of Detroit, of the commission, plans to keep open house at the offices of the commission here in the capitol for two or three days a week. Commissioner O. C. Tompkins, the Lansing member, will be here at all times.

TRAFFIC AND TRANSPORTATION

Commission Has Power to Raise Fares.

Albany, N. Y.—The Public Service Commission has decided that it has the power to permit up-state traction companies, which could demonstrate that the five-cent fares were not resulting in a reasonable return on the capital invested, and which were not bound by franchise agreements or special legislation, to increase trolley faces to six cents. The commission did not pass upon the question of whether it had jurisdiction in cases where special legislation or franchise agreements are held to be a bar to its authority. It merely determined the one question that it had authority to raise rates, notwithstanding the five-cent limitation in the general railroad law. The applicatons now being considered are those filed by companies operating in Newburgh, Peekskill, Ossining and adjacent territory. The commission issued the following statement: "In regard to the method of procedure in cases to be taken up in accordance with the foregoing, and in cases which may be taken up in pursuance of further determination which may be made by the commission as to its jurisdiction in any of the pending applications, the commission states that the burden of proof is upon the railroad corporations to establish that the present maximum rates are unjust and unreasonable and that with due regard among other things to a reasonable average return upon the value of the property actually used in the public service and to the necessity of making reservation out of income for a surplus and contingencies the proposed rates properly should be approved and fixed by the commission as just and reasonable." Meanwhile more briefs have been presented by cities affected by the increase.

Rochester, through corporation counsel Benjamin B. Cunningham, claimed that not only has the Public Service Commission no power in the case, but that even the legislature cannot alter the trolley fares here, as the Constitution prohibits it.

Mr. Cunningham cited two Court of Appeals decisions to show that a municipality has the right, and that it is its duty to bargain with a corporation for fare rates. "In Wilcox vs. Richmond Light and Power Company, says Mr. Cunningham, "it was held that local authorities, in granting consent, have the power to regulate rates of fare as conditions, the court saying: 'Not only was the insertion of the five-cent transfer clause a wise and prudent provision, but the omission of such protection would have worked grave injustice to the people.'" "There is no doubt," says another decision which Mr. Cunningham quotes, "that the rate of fare to be charged to and from points in the village, was a matter of such municipal and public interest that the municipal authorities might bargain with reference thereto. Therefore, the grant of the new franchise on the condition and consideration, amongst others, of a five-cent fare between the points now involved and the acceptance by the company thereof and its agreement to observe all the 'conditions, regulations and restrictions' thereof made a valid contract." The case of Willis vs. The City of Rochester is also cited by Mr. Cunningham. In that case it was necessary that the court should find that the regulation of fares was a matter of municipal concern, and the court did hold that "a rate of fare is a matter of municipal and public interest." For the second point of his brief the city attorney holds that the right to fix rates of fare is derived from the Constitution and not from the Legislature, and it is therefore beyond the power of the Legislature itself to alter such rates; "that the Legislature cannot confer upon the Public Service Commission power which it, itself, does not possess." Section 3 of Article 18 of the Constitution provides that the construction or operation of a street railroad shall not be authorized by the Legislature "except upon condition that the consent also of the local authorities having the control of that portion of a street or highway upon which it is proposed to construct or operate such railroad is first obtained." Mr. Cunningham cites a Court of Appeals decision in which the court says: "The municipal authorities granting this consent derived their power directly from the Constitution, which forbids the Legislature from enacting any law authorizing the construction or operation of a street railroad except upon condition that the consent of the local authorities be first obtained."

Rochester was the only city which objected on the ground of special legislation. The municipalities which advanced franchise agreements as a bar to the commission's jurisdiction were Auburn, Glens Falls, Amsterdam, Schenectady, White Plains, Little Falls, Oneida, Troy, Greenburg and Scarsdale. Other cities reserved the right to present oral arguments on the subject when their individual cases are called. Ogdensburg claimed it was an exception by reason of a contract between the railway company and the St. Lawrence state hospital. Oswego objected because its representative declared that prior to its railroad service being absorbed by the Empire State Railways, the local company was making an adequate return on the capital invested.

New York's Last Horse Car Really Goes.

New York, N. Y.—After several years of threats or promises, the last horse car has finally made its last trip in the city. Members of the public service commission and officials of the New York Railways company turned out to participate in the trip. Line after line of horse cars had been abandoned or replaced by electric lines in the past until only the Bleecker street line of the Bleecker Street and Fulton Ferry Railroad company, a subsidiary company of the New York Railways company, remained in the metropolis. Traffic on this line has been dwindling for some years, and recently the directors of the company voted to abandon the line. For several years the line has been operated with but a single car, which made trips back and forth at a losing business. The company says that in the fiscal year 1916 it carried 3,576 cash passengers and 1,045 transfer passengers, with total receipts of $178.80, the total receipts for the fiscal year 1917 falling to $103.60. On one day this month the total receipts of the car for the entire day were 10 cents. The commission was represented on

the last trip of the pioneer street car by commissioners Travis H. Whitney and Charles S. Hervey; Judge William L. Ransom, counsel; James B. Walker, secretary; George F. Daggett and Arthur McKinney, assistant secretary; and William G. Whiston, electrical engineer.

The Auto Headlight Problem.

Austin, Tex.—Representatives of ten firms manufacturing or dealing in various kinds of automobile headlight dimmers have signed an agreement with the state highway commission that they will abide the result of a scientific test of the merits of the different kinds of dimmers which will conform to the requirements of the law. These tests are to be made in the laboratory at the university under the supervision of Charles A. Duren, state highway engineer. The report of the tests will be made in writing to the commission; this report will be on file with the commission and will be available to anyone who desires to examine it. It is not the purpose of the commission to advertise any particular kind of headlight dimmers to the detriment of other kinds, but the merits and demerits of each dimmer tested will be clearly stated in the official report to be made.

Work on Madrid Subways.

Madrid, Spain.—Work on the Madrid subway system has now been in progress for three months in the Puerto del Sol, which is the center of the Madrid business district. The engineers in charge propose during the summer to begin similar construction work in eight or ten additional places along the line of the proposed subway and it is calculated that the total number of workmen engaged in this connection will approximate 3,000. The period within which it is expected the construction of the subway proper will be completed is fixed at 18 months from the date work was first commenced and it is expected that another six months will be occupied in laying the rails and completing the stations.

Street Railway Strikes Ended.

Seattle, Wash.—The strikes of the employes of the Puget Sound Traction, Light & Power Company in this city and Tacoma are now ended and cars have resumed operation after more than two weeks of practically no service. Following an alternative writ of mandate by court, directing the company to resume operation, it made an attempt to operate two cars on the downtown streets. A crowd of strikers' and sympathizers surrounded the cars, and bombarded them with bricks, rocks and other missiles. The windows in the cars were broken, and the motormen and conductor were badly injured. A second attempt the next day met with the same reception. Following the riots the company applied to federal court judge Neterer for an injunction restraining strikers and others from interfering with the operation of its cars. Judge Neterer stated that the situation called for executive action, not judicial, and denied the injunction. The company's petition asked that a sufficient number of U. S. marshals be appointed to protect the company and its employees. Judge Neterer, in his opinion, stated that the company was asking the federal court to do what should be done by the executive branch of the state and city, or in other words to "police the city." He declared that this was not the proper function of the court. When mayor Gill and police chief Beckingham detailed police to protect the cars a number of policemen struck and refused. They threatened to form a union to resist. Fifteen policemen were discharged and have not been reinstated. The municipal railway reaped a harvest on some lines. Passenger revenues, which have ranged from $38 to $45 a day for several years, jumped to about $340 daily. The jitneys, which were in the usual process of regulation, also did well during the strike. Through the efforts of the King County Council of Patriotic Service, the strikers' general committee was induced to agree to a conference at which five men from Tacoma, five men from the Seattle force, and the officials of the Puget Sound Traction, Light & Power Company, including A. W. Leonard, president; A. L. Kempster, manager at Seattle, and Louis H. Bean, manager at Tacoma, were present. The men are to be permitted to organize and affiliate with any union. The company agrees that there shall be no discrimination against union employees, and the men agree to work with non-union employees. The company agrees to reinstate the discharged Seattle employees. The seven discharged Tacoma employees will be reinstated providing the arbitration board of Tacoma railway sees fit. The settlement of matters relating to wages and working conditions will be submitted to an arbitration board consisting of Dr. Henry Suzzalo, C. J. Franklin, representing the company, and James A. Duncan, representing the employees. The findings of this board or a majority of it are to be effective from Aug. 1 and to be binding on the company and the employees for one year.

Tacoma, Wash.—A suit to compel the Tacoma Railway & Power Company to resume service was brought to the Pierce County Superior Court by the state public service commission and the city. In addition to the Tacoma Railway & Power Company, between 200 and 250 of the strikers, including the seven men whose discharge by the company precipitated the strike, were named as respondents. The employees were made parties to the action in order that they could state their side of the controversy. Charging conspiracy and intimidation, the Tacoma Railway & Power Company, in connection with the suit brought by the state public service commission, filed in the Superior Court injunction proceedings against F. A. Hoover and Edward McMorrow, international organizers of the Amalgamated Association. The company charged in its complaint that union organizers entered into an unlawful conspiracy to compel its employees to cease working, and by threats of violence and other methods of intimidation induced a large number of men to go out on strike. The agreements, however, terminated the troubles.

MISCELLANEOUS

Proposed Municipal Terminals for Norfolk.

Norfolk, Va.—With the letting of the first contracts work is to be begun at once on the city's municipal terminals, according to an announcement by city clerk Robert E. Steed. The board of dock commissioners has published the report on the proposed development near Sewalls Point following a study of the plan by B. F. Cresson, Jr., consulting engineer. The location of the terminal is decided upon in a contract between the city and the Norfolk & Portsmouth Belt Line Railroad. The four problems studied in the report are: (1) The best scheme for progressive development of the 2,400 feet front. (2) The character of construction of the first unit (required by the contract with the railroad). (3) The mechanical appliances for the most economical handling of merchandise. (4) The briefest possible time for construction. The main purpose of the board is "to provide a place to which all railroads shall have equal access to connect with foreign steamers, to assemble export cargoes, or receive their respective proportions of import cargoes, and where independent lines of foreign or coastwise steamers which may hereafter come, can be accommodated without the necessity of having their own terminals." The property which the city has acquired for development includes a strip of 500 feet in length outshore of the low water line, which was donated to the city on condition that it build a dock on it within two years. The total frontage on the low water line is about 2,400 feet. The site contains about 75 acres of land under water and 148 acres of upland. The comprehensive plan worked out by Mr. Cresson divides the property into four districts or zones: (1) A waterfront zone for the interchange of commodities between rail and water carriers, and for the storage of these commodities in transit. (2) A warehousing zone. (3) An industrial zone, and (4) A residential section. In the proposed development, railroad tracks lead to all the piers, to all the warehouses and to the industrial areas. Five piers are contemplated, ranging in length from 1,700 feet to 1,800 feet, each with a single story steel shed. Over a portion of these piers a second story is provided for use in connection with an immigration station, and for the general handling of passengers. The southerly of these piers is 150 feet wide and the others

are 175 feet wide. The slips between the bulkhead are 275 feet wide and at the pierhead line are about 330 feet wide. A grain elevator is planned with a conveyor leading to the sides of the two southerly piers for the direct unloading of grain into ships. The northerly pier is shown as an unshedded pier with the railroad tracks covering the outer portion with conveying machinery for the handling of heavy commodities between rail and water carriers. This provides for the direct unloading from the one to the other. The inner portion of this pier is reserved as storage room for heavy commodities which do not need protection from the weather. In the warehousing zone four warehouses are shown in the plans, each eight stories high, 150 feet wide and 350 feet long. These are served by railroad tracks and by a teamway. In the industrial zone four model loft buildings are proposed, each of eight stories, and about 100 feet wide. An additional area is set aside for industrial purposes. The initial unit provides for a pier 150 feet wide and 1,000 feet long. Access from the Government Channel to this pier is contemplated by dredging a 30-foot approach. The type of pier proposed is a reinforced concrete deck on creosoted timber piles and a single deck steel pier shed is contemplated on the outer 500 feet. The inner 800 feet of this pier is planned as a solid filled pier to be constructed later and the whole 1,800 feet to be shedded at some future date. Adequate bulkheading is provided for. Rail connections, water mains and electric light and power transmission lines are to be provided. For the latter items, $46,000 is the estimated cost, while dredging will cost $119,000; bulkheading, $112,500; pier, $225,000, and steel shed, $97,500, making a total of $600,000—the amount appropriated. It is calculated that the pier itself, up to and including the deck, can be built in 210 calendar days. The city has purchased the site of the docks at a cost of $391,430. The contract for the bulkhead has been awarded to Alsop & Peirce, Newport News, Va., and H. P. Converse & Co., Boston, Mass., has the contract for the construction of the pier. The completed installation will provide 1,308,750 square feet of shedded pier area, or slightly more than 30 acres, and 20,380 lineal feet of wharfage, or a little less than four miles. Barton Myers is president of the board of dock commissioners.

Bayonne Votes Down Terminal Project.

Bayonne, N. J.—With about half the voters absent from the polls because of the heat, this city, by a vote of 3,408 to 1,075, defeated at a special election the project of shore front development on New York Bay by the Bush Terminal Company. The terminal proposal was that the city should issue $10,000,000 of bonds to construct piers, storehouses, factories and connecting railroads under an agreement with Irving T. Bush, head of the Bush Terminal Company, which would provide that the proposed terminal plant be built and operated by Mr. Bush, who would divide the profits with the city, the plant at the end of fifty years reverting to the city free of cost. It was expected that in fifteen years the interest and sinking fund charges on the bonds should be so reduced that Bayonne would have an annual income of $1,000,000. The proposal included a terminal for a passenger and a vehicular ferry connecting with Manhattan. Bayonne business men formed a Bayonne Terminal Publicity Committee to educate the residents on the advantages of the proposed terminal, which had the indorsement and support of governor Edge and United States senator Frelinghuysen, but was hotly opposed by mayor Garven. One of the chief arguments against the proposal that apparently had weight with the voters was that the new terminal would attract an influx of cheap labor, which would be undesirable.

Plan Municipal Hotel.

Palto Alto, Cal.—The advisability of this city promoting and managing a municipal hotel has been practically agreed upon at a joint meeting of the city council, board of public works and city planning commission, and action taken to have plans of a building submitted for consideration by the board. Mr. Cheney, the city planning consultant, called attention to the necessity of having such improvements as may be made conform to the plans for the development of the plaza entrance that have been adopted by the planning commission and approved by the council. Prof. C. D. Marx moved that the meeting recommend to the council that plans be prepared and estimates made for the erection of a municipal hotel on the leased land and also plans and estimates for the improvement of the plaza entrance in accordance with the designs adopted. The motion was carried and representatives of the chamber of commerce pledged that organization to support the project enthusiastically. To carry out the suggested project would require a bond issue in such sum as would be found necessary, possibly from $50,000 to $100,000.

TERMINAL, PORT AND INDUSTRIAL DISTRICT DEVELOPMENT PLANNED FOR NORFOLK.

THE MUNICIPAL INDEX

In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading Periodicals.

It is our purpose to give in the second issue of each month a list of all articles of any length or importance which have appeared in all the American periodicals and the leading English, French and German ones, dealing more or less directly with municipal matters. The Index is kept up to date, and the month of literature covered each time will be brought up to within two or three days of publication. Our chief object in this is to keep our readers in touch with all the current literature on municipal matters. In furtherance of this we will furnish any of the articles listed in the index for the price named after each article, except that where an article is continued in two or three issues of the paper, the price given is for each of said issues. In addition to the titles where these are not sufficiently descriptive or where the article is of sufficient importance, a brief statement of its contents is added. The length also is given, and the name of the author when it is a contributed article.

ROADS AND PAVEMENTS.

Accounting:

Accounting Form of the Highway Department of Milwaukee County, Wisconsin. 16 ills. 1,500 words. Good Roads, July 28. 10 cents.

Bituminous:

New Specifications of Michigan State Highway Department for Bituminous Concrete Roads. 2,500 words. Better Roads & Streets. July. 15 cents.

Detailed Cost of Bituminous Surface Treatment Work in Philadelphia, 1,000 words. Engineering and Contracting. July 4. 10 cents.

Concrete:

Ohio State Concrete Roads Have New Specifications. 750 words. Engineering News-Record. July 26. 15 cents.

Removal of Excess Water in Concrete Road Construction. Wet mixture is handy to use. Excess water can be removed by proper manipulation. 2,000 words. Engineering and Contracting. July 4. 10 cents.

Wide Roadway of Cleveland Bridge Concreted Cheaply. Form travelers hung from stringers. Concrete delivered on track loop formed by bridge over roadway. 4 ills. 1,500 words. Engineering News-Record. July 19. 15 cents.

Concrete Road Laid in Freezing Weather at Slight Extra Cost. Covered with canvas before initial set. By F. E. Semon. 1,500 words. Engineering News-Record. July 5. 15 cents.

Construction:

Three-Hopper Car Delivers Proportioned Batches to Paving Mixer. Batches made up at stock bins. Industrial railway and three-hopper car take batches to mixer. Motor trucks average 8-mile round trip per hour with 4-yd. load. 7 ills. 1,000 words. The Contractor. July 20. 10 cents.

Cutting Sheet Asphalt with Angle Iron and Road Roller. A scheme for simplifying a disagreeable and troublesome job. Considerable saving in cost. By R. C. Cram. 3 ills. 1,000 words. Electric Railway Journal. July 7. 10 cents.

Emergency Road Construction in Pennsylvania. Trying to make a record of two miles of complete construction a week to serve the military camp at Mt. Gretna. 3 ills. 1,100 words. Municipal Journal. July 26. 10 cents.

Vermillion County Highway Improvements Engineers' and contractors' methods described. By P. C. McArdle, superintending engr. 5 ills. 1,750 words. Municipal Engineering. July. 25 cents.

The Completion of the National Road Through Ohio. From a paper by R. M. Waid, before Ohio Engineering Society. 15 pages. Journal of the Ohio Engineering Society. $1.00.

Road Construction and Improvements by Means of Town Planning Schemes. Views of municipal and county engineers. 9,000 words. The Surveyor. June 8. 40 cents.

Convict Labor:

The Honor System in the Use of Prison Labor in Construction and Maintenance of Public Highways. By F. M. Williams. 4 ills. 2,000 words. Better Roads & Streets. July. 15 cents.

Design:

Alignment, Grades and Cross-Sections. Address delivered by W. J. Carrell. 2,000 words. Better Roads and Streets. July. 15 cents.

Ohio Practice in Widening and Superelevation of Pavements on Highway Curves. 1 ill. 1,000 words. Engineering and Contracting. July 4. 10 cents.

Earth:

Construction of Dirt Road, Transportation of earth, building embankments and standard plant. 1,500 words. Contracting. July. 20 cents.

Foundation:

Soil Texture and Stratification Affecting Road Foundations. By C. R. Thomas. 5 ills. 800 words. Engineering and Contracting. July 4. 10 cents.

Use of Sub-Base with Concrete Surfaces. Result of investigation conducted by Universal Portland Cement Co. 1,500 words. Engineering and Contracting. July 4. 10 cents.

General:

Meets Highway Contractors' Labor and Material Problem. Massachusetts State Highway Commission introduces cost-plus-unit-profit contracts to remove gambling element. 1,400 words. Engineering News-Record. July 26. 15 cents.

Advertising Paving in Chicago. Paving contractors in that city conduct campaign to promote confidence of tax payers in paving work and stimulate further paving work. 1,000 words. Municipal Journal. July 19. 10 cents.

How Are Vertical Loads Distributed to Earth Fills? Tests made by office of public roads give method of finding spread of concentrated load. 2 ills. 1,000 words. Engineering News-Record. July 19. 15 cents.

Road Survey Methods of the Kentucky Department of Public Works. Abstract of Bulletin No. 9, Ky. Department of Public Roads. 2,200 words. Good Roads. July 28. 10 cents.

Standards for Plans for Federal Aid Road Projects. 2,000 words. Engineering and Contracting. July 4. 10 cents.

Legal:

General Highway Traffic Law of New York. 3,500 words. Good Roads. July 14. 10 cents.

The New Highway Law of Illinois. 1,200 words. Good Roads. July 28. 10 cents.

Machines:

Modern Road Making Machinery: Its Selection, Use and Care. From paper by W. Huber. 2,700 words. Canadian Engineer. July 5. 15 cents.

Machine Work Hastens and Cheapens Street Grading. Hand and machine methods of making wide shallow cuts contrasted. Excavator crowns bottom of cut closely to cross section. Little time lost in traveling from job to job. 2 ills. 1,000 words. The Contractor. July 20. 10 cents.

Maintenance:

The Maintenance of Federal Aid Roads in Texas. From a paper by J. D. Fauntleroy. 2,000 words. Good Roads. July 28. 10 cents.

Methods and Cost of Road Maintenance, Repair and Reconstruction in New York State in 1916. 5 ills. 3,500 words. Good Roads. July 14. 10 cents.

Method and Cost of Concrete Road Maintenance in Milwaukee County. 800 words. Engineering and Contracting. July 4. 10 cents.

Military Roads:

Military Road Building in Pennsylvania. 6 ills. 1,000 words. Good Roads. July 21. 10 cents.

Military Roads in France. Methods of maintenance and construction. 1,000 words. Municipal Journal. July 12. 10 cents.

Pavements:

Street and Road Pavements. Design, construction and maintenance. Description of progress, including points on best practice in concrete road construction. 6 ills. 4,000 words. Municipal Engineering. July. 25 cents.

Sidewalks:

Sidewalk Problems—How They Are Solved. 4 sidewalk contractors contribute ideas. 1,000 words. Concrete. July. 20 cents.

Street Railway Tracks:

What Shall We Do With the Paving Burden? Summons authorities to prove injustice of making the railway maintain paving between car tracks. By R. C. Cram. 6 ills. 8,000 words. Electric Railway Journal. June 23. 10 cents.

Methods and Materials for Paving Between Street Railway Tracks in Philadelphia and Baltimore. 6 ills. 1,200 words. American City. July. 50 cents.

Power Tools Speed Up Track Work. Pneumatic asphalt cutting tools and tie tampers, steam shovel and self-propelled concrete mixer called out to help solve the labor problem. By F. H. Hill. 12 ills. 3,000 words. Electric Railway Journal. June 30. 10 cents.

Wood Block:

The Details of Construction of Wood Block Pavements. By A. W. Dow. 3 ills. 8,000 words. Better Roads and Streets. July. 10 cents.

SEWERAGE, DRAINAGE AND SANITATION.

Activated Sludge:

50,000,000-Gal. Activated Sludge Plant Recommended for Stockyards District Chicago. 4,000 words. Engineering and Contracting. July 11. 10 cents.

Activated Sludge Plant at Worcester, England. Results of experimental work. 4 ills. 3,000 words. Canadian Engineer. July 12. 15 cents.

The Operation of the Activated Sludge Type of Sewage Plant. By G. B. Gascoigne. Sanitary Engineer of Cleveland. 8 pages. Journal of the Ohio Society of Engineers. $1.00.

Construction:

Sewer Construction by Open Cut and Tunnel Methods in Sanitary District of Chicago. 5 ills. 3,500 words. Engineering and Contracting. July 18. 10 cents.

Constructing an Open Concrete Storm Water Outlet. Creek channel enlarged by drag line scraper and lined with concrete. 3 ills. 600 words. Contracting. July. 20 cents.

Change From Trench to Tunnel Reduces Cost of Small Sewers. Sewer built in tunnel from 92 shafts, portable head houses being shifted from shaft to shaft. 3 ills. 2,500 words. The Contractor. July 6. 10 cents.

Industrial Railways Link Plant Units on Sewer Work. Separate track systems serve trenching and concreting operations. Batches proportioned at material yard delivered by one railway direct to mixer. 6 ills. 1,100 words. The Contractor. July 20. 10 cents.

Succession of Short Tunnels Beneath Shafts Reduces Pipe Sewer Excavation. 2 ills. 750 words. The Contractor. July 6. 10 cents.

Drainage:

Drainage Methods for Irrigated Shale Land. 4,000 words. Engineering and Contracting. July 11. 10 cents.

Purification Plants:

Dallas Builds Imhoff Sewage Works Fed by Concrete Pressure Line. Little leakage through expansion joints. Ground water at disposal plant is carried under tank bottoms. Steel from sections were used 12 times each. 7 ills. 2,000 words. Engineering News-Record. July 5. 15 cents.

Unusual Location of Tanks Obviates Pumping at Sewage Filters. Clarification at head of outfall gives low self-cleansing velocity and saves grade. Horizontal-flow, primary filters of coke make a high rate of sand filtration possible. By G. Everett Hill. 2 ills. 2,500 words. Engineering News-Record July. 12. 15 cents.

Sanitation:

Military Sanitation in the War. Methods and appliances used by the English and the French. Disposing of refuse. Providing drinking water. 3 ills. 3,800 words. Municipal Journal. July 26. 10 cents.

Sewers:

Deposits in Tidal-Water Sewers. Letter from Kenneth Allen. 2 ills. 1,000 words. Engineering News-Record July 19. 15 cents.

Stream Pollution:
Regulation of Stream Pollution in Texas. By V. M. Ehlers, State Sanitary Engineer. 1,500 words. American City. July. 50 cents.

Industrial Wastes Disposal. Discussion of river pollution and of methods of disposing of and recovering trade wastes. From a paper by Harrison P. Eddy. 5,000 words. Metallurgical and Chemical Engineering. July 1. 25 cents.

WATER SUPPLY.

Aeration:
Aeration of "Sulphur" Water in Florida. By Geo. W. Simons, Jr. 1 ill. 600 words. Engineering and Contracting. July 11. 10 cents.

Bacteria:
The Differentiation of Bacteria of the Colon-Aerogenes Family. From a paper by W. M. Clark. 1,250 words. Fire & Water Engineering. June 27. 10 cents.

Dam:
Earth Dam Compacted by Flooding. 4 ills. 1,000 words. Engineering and Contracting. July 18. 10 cents.

Design:
Design of the Railway Tank. Some of the interesting problems involved in the design of the modern railway tanks that are not found in any other structure. 1 ill. 1,200 words. Canadian Engineer. July 19. 15 cents.

Electrolysis:
Electrolysis in Underground Water Pipes. From a paper by J. W. Ivy. 3,000 words. Fire & Water Engineering. June 27. 10 cents.

Electrolysis in Underground Water Pipes. Stray currents. Local action. Mitigation of electrolysis. By J. W. Ivy. 3,000 words. Canadian Engineer. July 12. 15 cents.

General:
Oklahoma's Regulation of Water Supplies and Sewerage. New state law requires approval of water and sewerage plants by the State Board of Health. Preventing river pollution. 1,000 words. Municipal Journal. July 26. 10 cents.

Earthquake Breaks Los Angeles Aqueduct. By C. W. Geiger. 800 words. Municipal Journal. July 26. 10 cents.

Abstracts from Recent Water Works Reports. 1,250 words. Engineering and Contracting. July 11. 10 cents.

Rate Paying Engineers Criticize Montreal Aqueduct Report. 2,700 words. Canadian Engineer. July 12. 15 cents.

Funding Sanitary Improvements as a Means of Increasing Water Consumption. By R. A. Butler and F. C. Jordan. 2,500 words. Fire and Water Engineering. July 18. 10 cents.

Water Works Management in Akron. 800 words. Municipal Journal. July 19. 10 cents.

Reforesting Water Supply Land on Catskill System. Advantages of reforestation outlined. Available varieties of trees. Over 2,000,000 conifers planted around Ashokan and Kensico reservoirs. By F. F. Moore. 1 ill. 1,200 words. Engineering News-Record. July 12. 15 cents.

Making Surveys for Land and Lake Tunnel at Chicago. Methods employed. 2 ills. 2,500 words. Engineering News-Record. July 26. 15 cents.

Shipping Water Samples. Description of a 4-bottle case furnished to cities by the state board of health of West Virginia for shipping water samples. 1 ill. 1,000 words. Municipal Journal. July 12. 10 cents.

Pipe Lines:
Method of Laying 14,000-ft. Submerged Universal Pipe Line. 2 ills. 1,100 words. Engineering and Contracting. July 11. 10 cents.

Creosoted Woodstave Pipe Line for Irrigation Project. 3 ills. 1,000 words. Engineering and Contracting. June 11. 10 cents.

Deterioration of Carrying Capacity of Cast Iron Pipe. 1,750 words. Engineering and Contracting. July 11. 10 cents.

Cement Joints for Cast Iron Water Mains. Discussion by members of the A. S. C. E. 1 ill. 5,000 words. Canadian Engineer. July 19. 15 cents.

Experience with a Vitrified Water Conduit. Making water tight joints in a line of 18-inch vitrified pipe. Bituminous compounds were used. Difficulties due to use of cement. Method of making test and repairing leaking joints. 6 ills. 2,200 words. Municipal Journal. July 5. 10 cents.

Cast Iron Pipe Specifications. Discussion between the members of the American Water Works Assn. Committee, manufacturers and users. 5,000 words. Engineering News-Record. July 19. 15 cents.

Wrought Iron and Steel Pipe Sizes. Between ordinary pipes of the various weights there is a wide difference in actual internal diameters for the same nominal diameter. By A. J. Dickson. 1,500 words. Power. July 17. 5 cents.

Pumping:
Another Jump in Duty Record of Turbine Centrifugal Pumps. New Toronto unit is very efficient. 1,200 words. Engineering News-Record. July 26. 15 cents.

Saving Coal in the Waterworks Pumping Station. Losses in the boiler plant and how to prevent them. Utilizing heat in exhaust steam. Firing; air leaks; clean tube; high pressure; engine performance; slippage. By M. F. Stein. 1 ill. 2,500 words. Municipal Journal. July 19. 10 cents.

Distribution of Pumpage in Force Mains and Laterals. Chart illustrating flow-distribution survey made by pitometers at St. Louis water works. By F. L. Bock. 1 ill. 1,000 words. Engineering News-Record. July 12. 15 cents.

Electric Pumping in Michigan. 1 ill. 1,200 words. Municipal Engineering. July. 25 cents.

Purification:
Do Water Filters Make Water Shed Ownership Unnecessary? Water rate case in California involves a valuation of $4,000,000. 1,000 words. Engineering News-Record. July 5. 15 cents.

Electrolytic Cell Chlorine for Water Sterilizer. Description of method and apparatus employed for treating the public supply of Montreal, Canada. Cost compared with hypochlorite. 1,200 words. Municipal Journal. July 12. 10 cents.

Some Water Purification Experiences Difficulties with pipes for alum solution. Chemical solution agitators. Protecting concrete. Breaking of Tobin bronze strainer plates. From a paper by L. I. Birdsall. 1,600 words. Municipal Journal. July 19. 10 cents.

The New Brunswick Filtration Plant. Rapid sand, with capacity of six million gallons a day. Water passes over a large aerator before treatment. Wheeler type of strainer bottom used. 2 ills. 1,900 words. Municipal Journal. July 26. 10 cents.

Reservoirs:
California Reservoirs Silt Up Slowly. By Edward Bowen. 1 ill. 1,500 words. Engineering News-Record. July 26. 15 cents.

Sealing a 200-Acre Reservoir. To stop serious leak from Cedar river reservoir bottom clay and gravel are being sluiced in above dam. By J. D. Ross. 800 words. Engineering News-Record. July 26. 15 cents.

Building a 2,000,000-gal. Reinforced Concrete Tank. Constructed for Tuscaloosa, Ala. 4 ills. 2,000 words. Canadian Engineer. July 5. 15 cents.

Bottle Tight Basin with Circular Baffles Withstands Ice. Simple construction at Bedford, Ind., proves economical. New dry-line feeder is developed. 2 ills. 1,500 words. Engineering News-Record. July 5. 15 cents.

Supplies:
Sault Ste. Marie Water Supply Project. Present source is badly polluted and filters must be installed or new supply obtained. 5 schemes are suggested. Gravity supply favored. By R. O. Wynne-Roberts. 6 ills. 5,000 words. Canadian Engineer. July 12. 15 cents.

Water Supply in the Killarney Rural District. 2,000 words. The Surveyor. June 8. 40 cents.

Sources of Water Supply in the United States. 700 words. Municipal Journal. July 19. 10 cents.

The Toledo Water System. Ample supply of good quality. 1,200 words. Fire & Water Engineering. July 18. 10 cents.

Water Supply Standards and Their Improvement. By W. J. Orchard. 1,500 words. Fire & Water Engineering. July 18. 10 cents.

Recent Progress and Tendencies in Municipal Water Supply in the United States. By J. W. Alvord. 1,200 words. Fire & Water Engineering. July 25. 10 cents.

Thawing Pipes:
Thawing Water Pipe Trench. Experience in Pocatello, Idaho. 800 words. Municipal Engineering. July. 25 cents.

Waterworks:
Water Works Statistics. Supplementary to those published in the May 3rd issue. 3 pages. Municipal Journal. July 5. 10 cents.

Water Works Statistics. Special report to Fire & Water Engineering. 2 pages. Fire & Water Engineering. July 4. 10 cents.

Valuations:
Costs of Preparing Valuations for Small Water Companies. By A. F. Brewer, Jr. 1 ill. 2,500 words. Engineering and Contracting. July 11. 10 cents.

LIGHTING AND POWER.

Shading Street Lamps. Substitute for black paint inside the globe. 1 ill. 500 words. Electrical World. June 23. 10 cents.

The Lighting of Parks and Playgrounds. By H. A. Tinson and A. L. Powell. 4 ills. 3,000 words. The American City. July. 50 cents.

Concrete Lighting Standards. How the molds are made, the posts cast, cured and handled. 3 ills. 1,100 words. Concrete. July. 20 cents.

New Power Station at Albany. A modern small central station, substantially built to give service and make money. By C. H. Bromley. 12 ills. 5,000 words. Power. July 17. 5 cents.

Economical Combination of Water-Power and Steam Plants. A determination of the respective economic limits in steam and water power development. The economic limit depends largely on the value of money, fuel, labor and the increased efficiency of steam turbines and the location of the enterprise. By H. St. Clair Putnam. 1 ill. 2,000 words. Power. July 24. 5 cents.

Formulas for Determining Accurately Heat Carried Off by Flue Gases. 3,000 words. American Gas Engineering Journal. July 21. 10 cents.

Working Toward Saturation in 32 Towns. Interesting development in Iowa. Method of soliciting current sales. By Arthur Huntington. 2,000 words. Electrical World. June 23. 10 cents.

The Future of Electricity Supply. From an address by F. M. Long. 2,000 words. The Surveyor. June 22. 40 cents.

How To Intepret Diesel Indicator Cards. By E. R. Neale. 22 ills. 1,500 words. The Power Plant. July. 15 cents.

FIRE.

Inspection of Buildings. Rules adopted for the guidance of firemen in fire prevention work. 700 words. Fireman's Herald. July 14. 5 cents.

Fire Prevention in Canton. Weekly school for firemen; ordinances regulating rubbish and storing of gasoline. 1,000 words. Fire & Water Engineering. July 4. 10 cents.

Protecting the Factory From Fire. Inspecting forms and bulletins. By Wm. Guerin. 1,000 words. Fire & Water Engineering. June 27. 10 cents.

Fire Prevention and Taxation. From a paper by T. F. Baker. 2,000 words. Fire and Water Engineering. June 27. 10 cents.

Fire Department Practice. Rules formulated by Chief Clancy and Asst. Chiefs of Milwaukee. 1st instalment. 1,000 words. Firemen's Herald. July 7. 5 cents.

Practical Hydraulics for Fireman. By Fred Shepard. 6 ills. 1,250 words. Fire & Water Engineering. July 4. 10 cents. July 18. 10 cents. July 25. 10 cents.

An Attractive Fire Station. 2 ills. 500 words. Firemen's Herald. July 14. 5 cents.

Arson and Law. Crime regarded by prosecutors as most difficult in which to secure conviction. How firemen can help. From an address by H. A. Thornton. 1,500 words. Firemen's Herald. July 7. 5 cents.

The Benefit of Standard Hose Couplings and Cooperation Between Fire Departments. 1,500 words. Fire & Water Engineering. July 25. 10 cents.

Fire Alarm Telegraph Systems, Their Installation and Care. From a paper by F. A. Cambridge. 1,500 words. Fire & Water Engineering. July 25. 10 cents.

STREET CLEANING AND REFUSE DISPOSAL.

Refuse:
Specifications for Domestic Garbage Incinerators. A critical analysis of requirements. By C. C. Myers. 2 ills. 2,500 words. Gas Age. June 15. 20 cents.

Toronto's New Refuse Collection Wagons. Type of wagon developed. 1 ill. 1,000 words. Municipal Journal. July 19. 10 cents.

Electric Refuse Collection Truck. Operating results and cost in Dover, England. 500 words. Municipal Journal. July 12. 10 cents.

House Refuse: Its Calorific Value and Its Possibilities. By Reginald Brown. 3,250 words. The Surveyor. June 22. 40 cents.

Utilizing Waste Cans. Practice in England. 450 words. Municipal Journal. July 5. 10 cents.

Snow Removal:

Snow Fighting vs. Snow Removal at New York City. 2 ills. Engineering and Contracting. July 4. 10 cents.

Street Cleaning:

How Philadelphia Conducted an Educational "Clean Streets" Campaign. 2 ills. 2,500 words. Engineering and Contracting. July 4. 10 cents.

Work of Street Cleaning Department of New York City. Extracts from report of Street Cleaning Commissioner. 3 ills. 2,000 words. Engineering and Contracting. July 4. 10 cts.

Efficiency Methods in Street Cleaning. How New York City lowered costs while extending service and increasing wages. 4 ills. 3,000 words. Municipal Engineering. July. 25 cents.

Flushing: Its Place in the Street Cleaning Field. Basis for comparing results. Elements affecting costs. Standards of quality needed. Defective pavements increase cost of cleaning. By R. W. Parlin. 7 ills. 1,700 words. Canadian Engineer. July 19. 15 cents.

MOTOR VEHICLES.

Motor Trucks Deliver Concrete for Track Elevation Work. 2 ills. 1,000 words. Engineering & Contracting. July 25. 10 cents.

Timely Economy of Industrial Electric Truck. Extraordinary developments in last two years of electrically driven trucks. Battery charging a valuable off-peak load. 13 ills. 3,000 words. Electrical World. June 23. 10 cents.

Use of Automobiles for Survey Work for Irrigation Project. Advantages in using them for transportation purposes. 1,750 words. Engineering and Contracting. July 11. 10 cents.

Cost Data on Operation on Small Maintenance Trucks. 2 ills. 700 words. Engineering and Contracting. July 4. 10 cents.

Comparative Data on Cost of Operating Gas and Electric Cars. Tests made under various conditions show electric passenger car more economical in every case. 800 words. Electrical Review. June 30. 10 cents.

CITY PLANNING.

Underground Survey in Philadelphia. 250 words. Municipal Journal. July 5. 10 cents.

Improved Major-Street Plan for St. Louis Proposed by City Plan Commission. Lack of planning has resulted in disjointed narrow main-traffic streets with weak radical system. Widening and minor extensions proposed. Argument reinforced by striking maps. By Howard Bartholomew. 8 ills. 3,500 words. Engineering News-Record. July 19. 15 cents.

BRIDGES AND RETAINING WALLS.

Diagrams Facilitate Design of Concrete Retaining Walls. 2 standard types of wall considered, one without surcharge and the other with surcharge of Cooper's E-55 live loading. 2 ills. 1,000 words. Engineering News-Record. July 5. 15 cents.

Locomotive Cranes Erect Cantilever Over Ohio River. Suspended span practically completed. Structure is 1,120 ft. long. 4 ills. 1,100 words. Engineering News-Record. July 19. 15 cents.

Standard Bridge Floor of Concrete Slabs and Steel Beams. Weights, bending moments and costs computed for usual specifications. Live load a 15-ton road roller. By Wm. Smith. 4 ills. 2,000 words. Engineering News-Record. July 12. 15 cents.

The Economy of Good Highway Bridges. By Chas. D. Snead. 1 ill. 1,000 words. Southern Good Roads. July. 10 cents.

Bids for Concrete Arch Viaduct Less Than for Steel Design. James River bridge at Richmond, Va., illustrates advantages of concrete over steel railroad bridges. By H. G. Perring. 2 ills. 1,000 words. Engineering News-Record. July 12. 15 cents.

Cement Gun Construction Method. Review of application of gunite to wall construction and similar work. By Bryan C. Collier. 1 ill. 2,500 words. Canadian Engineer. July 12. 15 cents.

Standards of the Kentucky Department of Public Roads for Concrete and Steel Highway Bridges. By Rodman Wiley and C. D. Snead. 7 ills. 1,500 words. Good Roads. July 21. 10 cents.

Bascule Bridge Is Erected as a Cantilever. Bridge at Chattanooga erected by unusual methods. By W. J. Howard. 6 ills. 1,000 words. Engineering News-Record. July 26. 15 cents.

Bascule Bridge Across Cataraqui River. Details of construction and method of operation of 160-ft. span bascule bridge at Kingston, Ont. By R. K. Palmer. 8 ills. 2,500 words. Canadian Engineer. July 5. 15 cents.

Saving a Railway Bridge Built 63 Years Ago. Half-inch coating of gunite applied to brick work of abutment and eight piers of railway bridge at Weston, Ont. Three thousand sq. yds. shot in six weeks at a cost of 47c a yard. 3 ills. 1,500 words. Canadian Engineer, July 26. 15 cents.

Design of Steel Spans, 40 Feet and Up. By Chas. D. Snead. 3 ills. 2,500 words. Better Roads and Streets. July. 15 cents.

Bridge Maintenance in Philadelphia. 500 words. Municipal Journal. July 12. 10 cents.

Efficiency of Basic Pigments as Metal Primers. 1,500 words. Engineering & Contracting. July 25. 10 cents.

Service Tests on Bridge Paint. Study made by Iowa Highway Commission. 500 words. Municipal Journal. July 19. 10 cents.

MISCELLANEOUS.

Building the Army Cantonments. How the sites were selected; laying out the building location; purchasing and transporting the materials and supervising the work. Precautions against fire; building plans; water supply and sewerage. 4 ills. 5,000 words. Municipal Journal. July 12. 10 cts.

Building the Army Cantonments. Continued from July 12th issue. Some details of the individual cantonments. Engineering work at Camp Ayer. Topographical surveying, water supply and sewerage. 1 ill. 2,800 words. Municipal Journal. July 19. 10 cents.

Plans for Army's Big Training Camps Made Public. A system perfected for handling and checking rush deliveries of vast quantities of materials. Labor pay to be limited. 6 ills. 1,800 words. Engineering News-Record. July 5. 15 cents.

Construction and Structural Features of Cantonments for New National Army. Construction is now under way on all of the 16 cantonments. 3 ills. 3,500 words. Engineering and Contracting. July 25. 10 cents.

Interlocking Blocks Tied Together Concrete Chimney. By W. S. Winters. 3 ills. 1,500 words. Engineering News-Record. July 12. 15 cents.

Tapering Concrete Chimney Has Double Shell. Arrangement improves draft and efficiency and reduces liability of cracks. Is 180 ft. high. 2 ills. 800 words. Engineering News-Record. July 26. 15 cents.

Open Air Swimming Pools in Wisconsin Cities. 3 ills. 1,500 words. American City. July. 50 cents.

Trench and Tunnel Excavation. Various methods in use. 5 ills. 3,000 words. By J. F. Springer. Municipal Engineering. July. 25 cents.

Making Industrial Valuation for Tax Purposes. Appraisal of machinery and equipment quickly made. By G. E. Barrows. 1 ill. 2,000 words. Engineering News-Record. July 26. 15 cents.

Individual Interests in Municipal Enterprises. By J Horace Bowden. 3,500 words. The Surveyor. June 22. 40 cents.

Materials and Tests. Abstracts of papers before the American Society of Testing Materials. 1,800 words. Engineering News-Record. July 12. 15 cents.

Three-Batch Measuring Cars Supply Mixer for Gondolas. 1 ill. 500 words. By J. C. Foss. Enginering News-Record. July 5. 15 cents.

Materials and Methods of Tests Discussed at Meeting of American Society for Testing Materials. Abstracts of some of the papers. Subjects presented. 3,600 words. Engineering News-Record. July 5. 15 cents.

From Mixer to Forms at a Mile a Minute. Pneumatic method used to deliver concrete 4,000 feet in Twin Peaks Tunnel at San Francisco. 1 ill. 1,250 words. Engineering News-Record. July 12. 15 cents.

Problems in National Price Fixing. Interferences in purchasing may lead to government purchasing agency. 1,000 words. Engineering News-Record. July 19. 15 cents.

Starting a Fifteen Hundred Acre Land Clearing Contract in Jig Time. Work began two days after signing contract. 30 acres cleared and grubbed the first week. 2 ills. 1,200 words. The Contractor. July 20. 10 cents.

Base Plant Charges on Plant Rental Price. By Daniel J. Hauer. 1,000 words. The Contractor. July 6. 10 cents.

Averaging Thirty-six Hundred Yards a Day by Drag Line. Digging from above solves water troubles in sand cut. Side sloped by machine need only minor trimming. 4 ills. 1,000 words. The Contractor. July 20. 10 cents.

Pneumatic Concrete Mixing and Conveying in New York Subways. Second of two articles. Concreting segmental iron lining of tunnel tube. 5 ills. 1,000 words. Contracting. July. 20 cents.

Placing Concrete Ninety-nine Per Cent Mechanically. From the river bed to the arch ring gravel aggregate is untouched by hand. 1 set of form units serves for 6 piers. 6 ills. 1,000 words. The Contractor. July 20. 10 cents.

Conduit Installation Made in Toronto in Record Time. 24-duct line, 13,400 feet long, laid through downtown section within 2 months. 10 ills. 1,500 words. Electrical Review. June 30. 10 cents.

Tests of Concrete Slabs to Determine the Effect of Removing Excess Water Used in Mixing. From a paper by A. M. Johnson. 1 ill. 1,500 words. Good Roads. July 21. 10 cents.

Logic for Engineers, Induction and Deduction. The seventh in a series of articles. By Halbert P. Gillette. 3,500 words. Engineering and Contracting. July 4. 10 cents.

Surety Bonds Under Government Contracts. A review of the most important cases. From a paper by Wm. B. King. 5,000 words. Engineering and Contracting. July 18. 10 cents.

Methods of Locating Curves on Subdivisions. Location of regular curves by deflection angles. Graphic methods of laying out curves and random location of lot corners. By R. R. Grant. 2600 words. Canadian Engineer. July 26. 15 cents.

Reinforced Concrete Ships. By J. L. Weller. 2 ills. 1500 words. Canadian Engineer. July 26. 15 cents.

Distribution of Pressures Through Earth Fills. From a paper by A. T. Goldbeck. 5 ills. 2,000 words. Canadian Engineer. July 26. 15 cents.

Cleveland Subway Cuts Sheeted with Round Piles. Run motor trucks through excavation and load them by steam shovel on east end; use cranes and portable hoppers on west approaches. 5 ills. 1,700 words. Engineering News-Record. July 26. 15 cents.

PERSONALS

Aull, John W., has been appointed a member of the Ohio State Highway Advisory Board by Governor Cox. Other members include D. H. Kirwan, D. H. Humphrey and A. R. McCulloch.

Coulter, William, district chief of the Boston, Mass., fire department, has retired after a service of 35 years.

Ferguson, J. C., mayor of Creston, Ia., has resigned the office in order to become a lieutenant in the Iowa forces.

Walker, Boyd, ditch engineer for Pottawattamie county, Ia., has been appointed acting county engineer to serve during the absence of Marshall Howard, county engineer, who is serving as captain of a company of engineers.

Whalen, Dr. W. E., city physician of Ogden, Utah, has resigned to enter army service.

(Continued on page 145)

NEWS OF THE SOCIETIES

Calendar of Meetings.

Aug. 15-17.—LEAGUE OF WISCONSIN MUNICIPALITIES. Annual convention, Racine, Wis. Secretary, Ford H. MacGregor, Madison, Wis.

Aug. 21-23.—NEW YORK STATE FIREMEN'S CONVENTION, Flushing, N. Y. Secretary, Thos. Honohan, Frankfort, N. Y.

Aug. 22.—UNION OF NEW BRUNSWICK MUNICIPALITIES. Annual convention, St. John, N. B. Secretary, James King Kelley, St. John.

Aug. 27-29.—UNION OF CANADIAN MUNICIPALITIES. Annual convention, London, Ont. Secretary, W. D. Lighthall, K.C., Westmount, Que.

Aug. 29-31.—UNION OF NOVA SCOTIA MUNICIPALITIES. Annual convention, Truro, N. S. Secretary, Arthur Roberts, Bridgewater, N. S.

Aug. 29-31.—ONTARIO MUNICIPAL ASSOCIATION. Annual convention, Toronto, Ont. Secretary, B. H. Spence, 705 Lumsden building, Toronto, Ont.

Sept. 10-15.—NATIONAL EXPOSITION OF SAFETY AND SANITATION. Annual conference, New York, N. Y. Secretary, W. C. Cameron, Continental and Commercial Bank building, Chicago, Ill.

Sept. 11-13.—AMERICAN ASSOCIATION OF PARK SUPERINTENDENTS. Annual convention, St. Louis, Mo. Secretary, Roland W. Cotterill, 533 City Hall, Seattle, Wash.

Sept. 11-14.—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. Annual convention, Niagara Falls, N. Y. Secretary, Clarence R. George, Houston, Tex.

Sept. 11-14.—NEW ENGLAND WATER-WORKS ASSOCIATION. Annual convention, Hartford, Conn. Secretary, Willard Kent, 715 Tremont Temple, Boston, Mass.

Sept. 18-20.—LEAGUE OF IOWA MUNICIPALITIES. Annual convention, Iowa City. Secretary, Frank G. Pierce, Marshalltown, Ia.

Sept. 18-20.—LEAGUE OF VIRGINIA MUNICIPALITIES. Annual convention, Lynchburg, Va. Secretary, L. C. Brinson, Portsmouth, Va.

Sept. 24-29.—LEAGUE OF CALIFORNIA MUNICIPALITIES. Annual convention, Santa Rosa, Cal. Secretary, Wm. J. Locke, Pacific Building, San Francisco, Cal.

Sept. 25-27.—SMOKE PREVENTION ASSOCIATION. Annual convention, Columbus, O. Secretary, Frank A. Chambers, City Hall, Chicago, Ill.

Sept. 27-29.—AMERICAN AND CANADIAN ENGINEERS AND ARCHITECTS OF NORWEGIAN BIRTH OR DESCENT. Informal congress and re-union, Chicago Norske Klub, Chicago, Ill. Chairman, Committee on Arrangements, Joachim G. Glaver, consulting engineer, Chicago, Ill.

Oct. 9-12.—LEAGUE OF KANSAS MUNICIPALITIES. Annual convention, Wichita, Kan. Secretary, C. H. Talbot, University of Kansas, Lawrence, Kan.

Oct. 15-17.—NATIONAL HOUSING ASSOCIATION. Annual conference, Hotel La Salle, Chicago, Ill. Secretary, Lawrence Veiller, 105 East 22d St., New York City.

Oct. 17-18.—LEAGUE OF MINNESOTA MUNICIPALITIES. Fifth annual convention, St. Cloud, Minn. Secretary-treasurer, Richard R. Price, University of Minnesota, Minneapolis.

Oct. 22-24.—AMERICAN CIVIC ASSOCIATION. Annual meeting, St. Louis, Mo. Secretary, Richard B. Watrous, 914 Union Trust building, Washington, D. C.

Nov. 19-24.—CITY MANAGERS' ASSOCIATION. Annual meeting, Detroit, Mich. Secretary, W. L. Miller, City Manager, St. Augustine, Fla.

Nov. 20-23.—PLAYGROUND AND RECREATION ASSOCIATION OF AMERICA. Recreation Congress, Milwaukee, Wis. Secretary, H. S. Braucher, 1 Madison Ave., New York, N. Y.

Nov. 21-24.—NATIONAL MUNICIPAL LEAGUE. Twenty-third annual meeting, Hotel Statler, Detroit, Mich. Secretary, Clinton Rogers Woodruff, 703 North American Bldg., Philadelphia, Pa.

League of American Municipalities.

The postponement of the annual convention of the League of American Municipalities, which has been announced for Sept. 5 to 8, has been requested by the president and secretary of the association.

League of Michigan Municipalities.

Federal control of all coal mines and shipments if necessary was urged by the League of Michigan Municipalities in session at Grand Rapids July 26 and 27. A resolution asking the government to take over the coal mines was passed and the president was instructed to wire the president.

Another resolution adopted asked an amendment to the state constitution to permit cities to operate fuel yards and sell coal. It was alleged in the discussion that retail coal dealers are not treating the public fairly.

Flint was selected as the convention headquarters for the 1918 meeting of the league. The following officers were elected: President, E. F. Johnson, Flint, former vice president; vice president, Mayor J. G. Reutter, Lansing; secretary-treasurer, Charles A. Sink, Ann Arbor.

Directors, R. V. Mundy, Bay City; Ira H. McKinnie, Alma; Philo C. Fuller, Grand Rapids; James W. Marsh, Battle Creek, and B. H. McMullen, Cadillac.

League of Third Class Pennsylvania Cities.

The annual convention of the third class city league will be held in Harrisburg August 28, 29 and 30.

Illuminating Engineering Society.

As announced in a previous issue, in place of the regular annual convention of the Illuminating Engineering Society this year it is planned to hold a correspondence convention. The Committee on Papers reports the following papers scheduled for inclusion in this convention:

Presidential address, by W. J. Serrill; report of Committee on Progress, by F. E. Cady, chairman; report of Committee on Nomenclature and Standards, by A. E. Kennelly, chairman; paper on "The Hemisphere as an Integrating Photometer for Projectors, Etc.," by F. A. Benford; a "Color Symposium," conducted as follows: Introductory, by M. Luckiesh; Physics, by H. C. Richards; Psychology, by L. T. Trowland; Specifications and Tests, by I. G. Priest; Color in Illumination, by Beatrice Irwin; a paper on "Importance and Value of Illuminating Engineering to Central Stations," by Thos. F. Kelly; "Application of Illuminating Engineering to the Gas Industry," by R. F. Pierce; "Growth and Present Status of Systems Used in the Maintenance of Gas Lamps in Residences," by E. B. Myers; "Lighting of Independence Square, Philadelphia," by E. F. Kingsbury; "Lighting of Textile Mills," by G. Wrigley; "Economics in the Operation of Large Lighting Installation," by C. L. Law and J. E. Buckley; "Illumination Intensities in Some of the Large Department Stores in New York City," by W. F. Little and J. F. Dick; "Illuminating and Engineering Advertising," by G. H. Stickney.

It is planned in a few weeks to arrange these papers in groups for release, respectively during September, October and November, and possibly December. Early in the month of release, copies will be sent to any one who may apply for them to the general office, and will be accompanied by invitation to submit a written discussion. The boards of managers of sections may, if they wish, utilize such papers for section meetings.

PERSONALS

(*Continued from page* 144.)

Blinn, Ray S., has resigned his position as city manager of Westerville, O., to go into the contracting business. Mr. Blinn was formerly director of public service and city engineer in charge of paving at Columbus, O.

Shenehon, Francis C., Mem. A. S. C. E., and for the past eight years head of the College of Engineering, University of Minnesota, is now giving exclusive attention to his practice as a consulting engineer, with offices at 628 New Metropolitan Bank building, Minneapolis, Minn. His special fields include water power, water supply, sewerage and sewage disposal, ship canals and river improvements, docks and terminals, flood control and drainage. He will also act as counsel in engineering litigation and settlements of engineering controversies and will prepare financial reports.

Dixon, G. Gale, chief engineering expert of the Akron water works, has been commissioned a captain in the engineers' corps at Fort Benjamin Harrison by the war department. Edward Nagle, also of the water works engineering staff, was commissioned as first lieutenant.

Johnson, Wilner E., 37 years old, for more than fifteen years engineer of car construction of the New York Municipal Railway company, died July 27 at his home, 1120 Elmore Place, Flatbush. He was the designer of the low-step "hobble car" now used by the Brooklyn Rapid Transit company. Mr. Johnson made a study of space allotment on transit lines, especially regarding seating capacity, and the result of this study was the production of the scientifically arranged seating capacity used in the Fourth avenue subway. He was a member of the American Electrical Railway Association and the American Society of Mechanical Engineers.

NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

TUNNEL PLATES.

"Hydraulic" Pressed Steel for Lining Tunnel Excavations.

"Hydraulic" pressed steel liner plates are used for the purpose of lining soft soil excavations for such construction as sewers, transit subways, utilities tunnels, waterworks tunnels, etc. They are left in place and the brick or concrete lining is built inside of them. They do not, nor are they intended to, afford a permanent shell protection, since the steel rusts much more quickly than cast iron. They are designed to protect the concrete or brick from any load until long after the time necessary for the material to become sufficiently hard to attain its required strength.

The excavation is made as closely as possible to the outside diameter of the steel plates so as to produce an even pressure all around the ring. If this is done the ⅛-inch-thick plate can then support a very large load and can be used safely at almost any depth. Economy of construction is the main feature of advantage claimed for this method and four principal reasons are advanced for this:

1. Because of the light weight, the erection can be accomplished by hand quickly and easily. A plate 12x⅛x30 inches weighs only about 18 pounds.

2. Each plate is an exact duplicate of every other plate, both as to size and perforations, so that no reaming, fitting or drifting is necessary as in built up plates.

3. By following up behind the excavation with the "Hydraulic" plates, it is claimed that the costly shield can be omitted. This obviates the use of piping, pumps and shield and the delay occasioned in operating the shield.

4. The operation of tunneling with the use of "Hydraulic" plate can be continuous. From two or three times as many lineal feet, it is claimed, can be excavated and lined per day as when the shield or cast iron lining is used, and with the same amount of labor.

The standard plate is 12 inches wide, ⅛ inch thick, and has a 2-inch flange. Any thickness up to 7/16 inch can be had to order.

The accompanying illustrations show the use of the tunnel plates on the big Passaic Valley (N. J.) sewer project and the method of installing them. They are made by the Hydraulic Pressed Steel Company, Cleveland, O. This company also makes a complete line of steel forms for concrete construction of all types. These are of open hearth steel and of standard shapes carefully and accurately pressed.

LENOX "AMERICAN" TRACTOR.

Four Wheel Drive and Four Wheel Steer.

The Lenox "American" tractor which is particularly adapted to all kinds of road work, is made in two sizes: 20 drawbar horse power and 60 drawbar horsepower. The power is transmitted direct from the driving axles to the face of the four lightweight drive wheels by pull rods, so that none of the driving strain comes on the spokes. The axles are steered, not the wheels. This makes operating easy, allows short turn and helps in steering in and out of ditches and furrows. It can therefore be successfully used on very bad roads in breaking up the drifts in winter, or in rolling out the muddy roads in spring. Side drifts are easily overcome and the tractor can go over piles of rocks, logs and holes. The patented drive wheels, light but very strong, make it possible to work in difficult sand, ice or snow. The wheels do not clog up between the cleats. Another feature of advantage in road work is that in cold or stormy weather the driver is completely protected and because of the location of motor, exhaust and seat there is no uncomfortable overheating.

The motor is four-cylinder, 4-cycle, 4¾ by 5½, extra heavy crank shaft, large valves, in the smaller tractor and six-cylinder, 4-cycle, 5¾ by 7 in the larger. The same type motor is used in both sizes. Both motors are capable of delivering full rated horsepower continuously. A semi-heavy duty moderate speed, vertical type T head engine is used. There are two ignition systems on a double switch: A dry battery and vibrating coil with distributor, set stationary, for starting motor, which prevents the possibility of back-firing and independent high tension magneto for working. There is no spark lever. All that is required for operating is throwing switch, keeping connections secured fast and spark plugs clean.

Cooling is by forced circulation through large outlets, with extra large six-blade fan. No belts are used. The fan is driven direct from crank shaft by gear. The fan gear is provided with a clutch in light tension to relieve all shocks from fan and gear. The radiator is of special design, and is always sufficient to keep the motor cool, water being replenished not more than once a week. Lubrication is by force circulating pump to all bearings and cylinders. All tractor bearings contain sufficient grease for a season's work. The large flywheel relieves shocks in starting heavy loads.

Bolting Plates Together.

"HYDRAULIC" PRESSED STEEL TUNNEL PLATES.

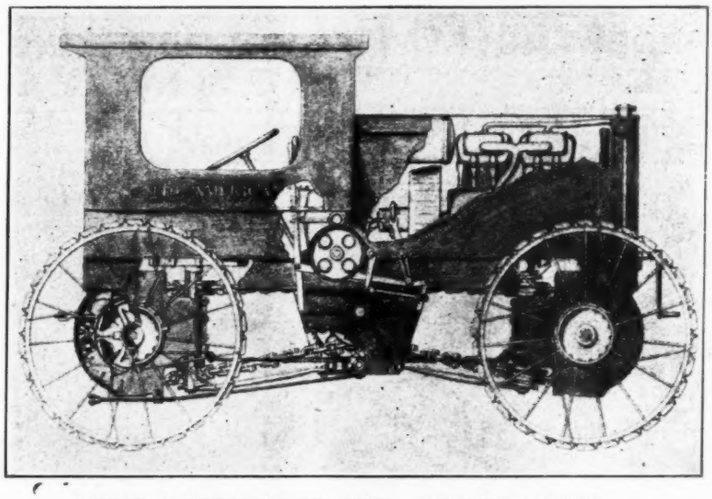
Used on Passaic Valley Sewer.

The clutch, specially designed, is also large. It applies smoothly, but will not slip when engaged. There are no springs or catches of any kind. It operates with worm and sleeve. The transmission is three speeds forward and one reverse, selective type. It is a complete unit, with gear shift, clutch coupling, and final drive all built in transmission. The gears are large and of highest quality gear steel, properly heat treated and hardened. Each shaft has three bearings of white metal, and all bearings are self-lubricating. In the 20 horsepower model, final drive is through patented adjustable chain made of vanadium steel, extra strong. It performs like a belt, but it does not slip or run off, and eliminates universal joints, drive shafts and bevel drive gears. The wearing surface is many times larger than in ordinary drive chains. Each link is readily adjustable, without taking off anything or without any preparation whatever. The brake is a contracting band on large drum, and is operated by same lever that operates clutch, but they do not interfere with each other in operation.

The wheels in the 20 h. p. model are 60 inches high with 18-inch face.

The steering gear is of the worm and worm wheel type, completely enclosed in housing. Connection to the axles is made through block chain and turnbuckles. The gear is operated by a large hand wheel in the middle of the cab, placed conveniently close to the control levers so that all can be easily reached by the operator.

Two levers control all the operating of this tractor. One is used solely to shift gears. With the other, first the clutch is released, then the throttle closes, and, last of all, the brake is applied. On the reverse motion of this second lever, the brake is released, motor speeded up and the clutch engaged. When the tractor is started by engaging clutch, the motor is so connected that the speed is increased to the point desired. The advantage gained is that the motor **anticipates** the load and is speeded up to take the load. The device is designed to prevent the racing of the motor, either before or after applying load. There is a governor built into the motor which will not interfere in any way with the operation of this controlling device.



LENOX "AMERICAN" TRACTOR (CUTAWAY VIEW).

The speed of the 20 h. p. machine is from ⅛ to 7 miles per hour; on low speed, 1⅝ miles; second speed, 2½ miles and high speed, 6 miles. The 60 h. p. tractor can make up to 6 miles per hour—five miles on high. The smaller tractor develops nominally 3,000 pounds drawbar pull and the larger one 8,000 pounds.

The accompanying illustrations show a cut-away view of the tractor (note the few working parts and direct transmission from motor to axles) and the machine at work hauling. The tractors are made by the Lenox Motor Car Co., Hyde Park, Boston, Mass.

LENOX "AMERICAN" TRACTOR HAULING ROAD MATERIALS

INDUSTRIAL NEWS

Cast Iron Pipe.—Prices continue at the record high levels of the last few weeks. While private buying continues to some extent, only a few cities are making the best of the situation and buying for urgent needs. Quotations: Chicago—4-inch, class B and heavier, $68.50; 6-inch, $65.50. New York—4-inch, class B and heavier, $68.50; 6-inch, $65.50. Birmingham—4-inch, class B and heavier, $63; 6-inch, $60; class A, $1 extra.

The Goodyear Tire & Rubber Co., Akron, O., announces the following changes in its organization: W. A. Hazlett, formerly manager of the Detroit branch, has been appointed manager of the Detroit district. P. E. Ammon, who has been special dealers' representative of the Detroit district, becomes assistant to Mr. Hazlett. H. G. Norris, formerly manager at Toledo, has been promoted to the management of the Detroit branch. G. H. Hilbish has assumed charge of the Toledo branch, and is succeeded at Saginaw by Mr. W. D. McFarland, formerly a salesman in that territory. F. W. Telford, who has been Goodyear manager at Des Moines, has been assigned to the manufacturers' division at Detroit. R. E. Greene, former assistant manager at Minneapolis, succeeds Mr. Telford at Des Moines.

Testing Cement for United States.—According to an announcement by director A. P. Davis of the U. S. Reclamation Service and director S. W. Stratton of the Bureau of Standards, the work conducted in the laboratories of the Reclamation Service at Denver, Colo., and San Francisco, Cal., is to be taken over by the Bureau of Standards. The personnel and equipment of these laboratories are to be transferred to the Bureau of Standards and maintained substantially as at present. Orders for cement shipments and inspection will be sent by the office of the chief of construction to the Denver office of the Bureau of Standards with copies to other offices, if desired. Government bills of lading will be furnished by the office of the

chief of construction when shipments are ordered. After the cement has been tested and accepted these will be completed by the representative of the Bureau of Standards at the works. Records of tests and inspection will be kept by the Bureau of Standards and will be available for examination by the Reclamation Service. When shipments are to be made from works near a reclamation project where no permanent inspector is maintained by the Bureau of Standards, the Reclamation Service will, if feasible, furnish an inspector from such project, if requested by the Bureau of Standards.

The Bureau of Standards will also make tests and analyses of concrete and concrete aggregates, chemical analyses of water and soils, and other tests and analyses required by the Reclamation Service. Pending the final provision for the complete maintenance of these laboratories by the Bureau of Standards, the necessary funds are to be supplied from the appropriation for the work of the Reclamation Service.

The Autocar Co., Pittsburgh, Pa., is building a large machine shop at Ardmore, Pa., where its plant is located. The American Bridge Co. will erect a steel building for this shop.

The International Motor Truck Co., Allentown, Pa., has completed the order received from Great Britain for 150 Mack "Bulldog" trucks. Each will have a capacity of five tons and is meant for service at the French front. All the trucks went to New York on their own wheels for shipment across the ocean. During June the plant turned out 140 trucks, but in the future will not try to exceed the usual rate of 125 a day.

The Federal Motor Truck Company, Detroit, Mich., announces the election of W. C. Rowley, for some time a member of the board of directors, to the position of vice-president in charge of sales, succeeding J. F. Bowman, resigned. Mr. Rowley assumes his new duties August 16. Mr. Rowley has been connected, in various capacities, with the Michigan Central Railroad for 32 years. In 1903 Mr. Rowley became general freight agent at Detroit, from which he resigned to take up his duties with the Federal Motor Truck Company. Mr. Rowley has been for several years a member of the board of directors, and at the same time one of the largest stockholders of the Federal Company.

Another Course in Concrete.

A Short Course in Concrete with the co-operation of the extension division of the Portland Cement Association has been arranged, on which occasion industrial arts and vocational teachers will have the opportunity to acquaint themselves with the fundamentals required for the successful teaching of this subject. The course will be held from August 13 to 31, inclusive, at George Peabody College for Teachers, Nashville, Tenn. The course will include lectures, demonstrations, classroom and laboratory work. Several topics in the course will be illustrated with motion pictures, lantern slides, charts and models. Opportunity will be offered for practice in the various types of concrete work. Schools which are regularly carrying on concrete classes will be asked to send course outlines, drawings, report forms, and photographs, as well as specimens of their form work and concrete exercises, which will be on exhibition during the course. The general outline of the course follows:

1. Materials for Concrete, Tests, Methods of Selection, Proportioning.
2. Mixing and Depositing Concrete.
3. Tools and Equipment for Industrial Arts Work with Study of Smallest Practical Units.
4. Forms for Simple Exercises.
5. Surface Treatment.
6. Methods for Curing Concrete Products.
7. Watertight Concrete: Methods of Repairing Leaky Cisterns and Tanks.
8. Fundamental Principles of Reinforcing.
9. Concrete Highway Construction.
10. Practical Problems for Concrete Courses. Relation to Individual's Use as a Citizen. Concrete in Wartime Uses: Methods of Meeting Wartime Demands Through Concrete Courses. Appropriateness Element in Problem Selection.
11. Application of Plaster and Glue Form Work to Modern Building Ornamentation.

Registration for summer courses is to be made at Teachers' College, Nashville, Tenn., on regular registration days. For information apply at once to R. W. Selvidge, Peabody College for Teachers, Nashville, Tenn.

PROBLEMS CITIES ARE STUDYING WITH EXPERTS

Austin, Tex., has retained as expert to investigate the Austin DAM FAILURE, Daniel W. Mead, Madison, Wis.

SEWERAGE IMPROVEMENTS are to be made by Milford, Ia. The engineer for the work is Chas. P. Chase, Clinton, Ia.

Bonds have been voted by Glendale, Ariz., for the construction of a SEWERAGE SYSTEM. The engineer for the work is F. Holmquist, Phoenix, Ariz.

In studying the ELECTROLYSIS PROBLEM, the city of Trenton, N. J., has had the expert engineering counsel of E. E. Brownell, Philadelphia, Pa.

Barberton, O., is to construct SEWERS; plans and specifications for which have been prepared by R. Winthrop Pratt, 708 Hippodrome building, Cleveland, O.

A number of STREET IMPROVEMENTS are to be made by Pioneer, O. The engineering work is in the hands of the L. A. Boulay company, 1250 Nicholas building, Toledo, O.

East Dubuque, Ill., is planning STREET IMPROVEMENTS. The engineers for the work are M. Tschirgi & Sons, American Trust building. Cedar Rapids, Ia.

Woodburn, Ore., is to build a SEWER SYSTEM according to plans prepared by L. B. Wickersham, Chamber of Commerce building, Portland, Ore., and approved by the State Board of Health.

A $500,000 BRIDGE is to be constructed by the Sebastian Bridge district, Ft. Smith, Ark. The engineers to prepare plans and specifications are Hedrick & Hedrick, Interstate building, Kansas City, Mo.

Comprehensive SEWAGE DISPOSAL PLANS are being worked out by the Indianapolis, Ind., sanitary commission. The consulting engineer for the work is George W. Fuller, of Fuller & McClintock, 170 Broadway, New York, N. Y.

SEWERS to be constructed by Linndale, O., were planned by J. B. Davis & Son, 876 The Arcade, Cleveland, O.

Larned, Kans., is to build a SEWAGE DISPOSAL PLANT. Plans for the work are being drawn by Black & Veatch, 507 Interstate building, Kansas City, Mo.

Brooklyn Heights, O., is making some HIGHWAY IMPROVEMENTS. The engineer for the work is F. R. Lander, 306 American Trust building, Cleveland, O.

West Point, Va., is to make a number of PAVING IMPROVEMENTS. The plans and specifications for the work were prepared by Knox T. Thomas, 502 Forsyth building, Atlanta, Ga.

Bonds for WATERWORKS improvements have been approved by New Wilson, Okla. The work is to be planned by the Benham Engineering Co., Colcord building, Oklahoma City, Okla.

WATERWORKS IMPROVEMENTS are proposed for Marietta, O. Plans and specifications have been completed by Chester & Fleming, Union Bank building, Pittsburgh, Pa.

SEWER EXTENSIONS being made by Spring Valley, Minn,. were planned by J. H. A. Brahtz, 312 Commercial building, St. Paul, Minn., and E. W. Goldenstar, I. O. O. F. building, Mankato, Minn

WATERWORKS and a SEWERAGE SYSTEM are to be built by Hamilton, Mo. Plans and specifications were prepared by E. T. Archer & Co., 609 New England building, Kansas City, Mo.

Confronted by the problem of inadequate FUEL SUPPLY for its utility plants, Cleveland, O., has been considering a number of propositions for municipal coal mines and for purchasing direct from mines. Prof. H. E. Nolds, Ohio State University, has been appointed to investigate and report.